

PILLAR CREEK HATCHERY ANNUAL MANAGEMENT PLAN, 1997

By

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INTRODUCTION

Pillar Creek Hatchery (PCH) was constructed in 1990 as a cooperative project between the Alaska Department of Fish and Game (ADF&G) and Kodiak Regional Aquaculture Association (KRAA). The facility is located on the Kodiak road system about seven miles north of the City of Kodiak (Figure 1). PCH was designed to increase salmon production for Kodiak Island seiners and set gill net fishers by enhancing barren-lake systems with juvenile sockeye salmon and to a lesser extent, juvenile coho salmon. In addition, hatchery programs were expected to supplement wild stocks to rehabilitate depleted runs. PCH has the capacity to incubate 20 million salmon eggs and rear up to 16 million juveniles of all life stages (fry, fingerlings, presmolt and smolt). The facility is operated by funds provided by KRAA.

The primary project facilitated by PCH is the stocking of late run sockeye salmon fry into Spiridon Lake (KNWR 1991). This project utilizes Spiridon Lake as a fry nursery area to produce smolt which, after leaving the lake, return as adults to provide a common property sockeye salmon fishery. Limnology investigations indicate that the optimum rearing capacity of the lake is about 11 million sockeye salmon fry. In order to minimize the impacts of rearing juvenile salmon on the standing crop of macrozooplankton a conservative stocking strategy has been adopted. Thus, the current stocking level is between 5 and 7 million fry. The brood stock in the initial development stage of the project has been late run Upper Station sockeye salmon. A portion of eggs collected at Upper Station were incubated and reared to presmolt and smolt at Kitoi Bay Hatchery (KBH). These juveniles were released at Little Kitoi Lake and estuary to develop a brood source at the KBH for the Spiridon Lake project. The 1994 Hatchery Management Plan was amended to change the brood source for the project to Saltery Lake sockeye for an interim period until the brood source goals were attained at Little Kitoi Lake. This brood source change was approved by the U.S. Fish and Wildlife Service (FWS) for one year. In 1995, Upper Station sockeye salmon were, again, used for brood stock. To date the sockeye run to Little Kitoi has not provided sufficient salmon for brood stock. Further research by ADF&G and the FWS indicate that Saltery stock may be preferential for Spiridon Lake stocking (Honnold *in press*). The run timing of Saltery Lake sockeye is slightly earlier than the Upper Station sockeye; by switching to Saltery stock the brood stock requirements at KBH will be easier to achieve because the Saltery stock should return after the peak of the chum salmon run and before the peak of the pink salmon run. In 1997, upon approval by the Commissioner of ADF&G and representatives of the FWS, the Kodiak Regional Planning Team, and KRAA, Saltery Lake stock will be the brood source for the Spiridon Lake project.

In addition to Spiridon Lake, late run sockeye enhancement is ongoing at Jennifer and Ruth Lakes (falls on these systems prevent fish entry into the lakes; Figure 1) which are scheduled for stocking in 1997 using Upper Station and Saltery fry, respectively. In 1998, we propose discontinuing late run stocking at Jennifer Lakes and switching to an early run stock (Afognak Lake) for enhancement. This would eliminate all PCH stocking projects using late run Upper Station sockeye. Little Kitoi Lake will be stocked with Saltery Lake sockeye salmon from KBH to develop a brood source; replacing Upper Station late run as the primary stock for brood stock development (Hall et al. *in press*).

PCH also provides early run sockeye salmon fry for several barren lakes in the Kodiak area. In 1997, these stocking projects will utilize Afognak Lake sockeye as the brood source and include

Hidden, Little Waterfall, Crescent, Sorg, and Little Kitoi Lakes (Figure 1). Lake enrichment has been conducted at Little Waterfall Lake since 1993 and is scheduled to end in 1998. Little Kitoi Lake is a candidate for lake fertilization once a layer of hydrogen sulfide is removed from its main basins. In 1998, we propose discontinuing early run fry stocking at Little Kitoi Lake. The decreased potential early run production will be replaced by stocking Afognak Lake fry into Jennifer Lakes. In 1992, 1994, and 1996, eggs collected from Afognak Lake sockeye survived to fry in excess of projections. These extra fry were stocked back into Afognak Lake to avoid excess stocking levels at the barren systems, which are quite sensitive to grazing effects (on zooplankton) by juvenile sockeye. Afognak Lake has maintained a stable zooplankton population as well as increased adult production during this period. The addition of nutrients (lake fertilization funded by KRAA) has been ongoing at the lake since 1990. In 1996, female fecundity and egg to fry survival, again, appear higher than expected and we project approximately 400,000 excess juveniles will be stocked into Afognak Lake in 1997. In 1998, we propose continuing the use of Afognak Lake as a contingency stocking location in the event excess early run (Afognak Lake) fry are produced. We also propose using Saltery Lake as a contingency stocking location if excess late run (Saltery Lake) fry are produced in 1998. This lake is being considered for lake enrichment in the future.

Sockeye stocking in conjunction with lake fertilization began at Malina Lake in 1991-1992 to rehabilitate this depleted early run (Figure 1). Malina Lake eggs are collected each year, incubated at PCH, and juveniles (fry and presmolt) stocked into the lake. The lake is responding to fertilization; however, zooplankton density and biomass estimates have resulted in reduced actual stocking levels compared to planned stocking levels (Clevenger et al. 1996). That is, maximum number of juveniles stocked has been ~500,000 compared to the planned >1 million fry. The stocking level is expected to remain between 500,000 and 1 million in 1997 and 1998.

Laura Lake is also being fertilized and supplemented with sockeye fry of Laura Lake origin to rehabilitate the (early) run (Figure 1). Egg takes at this system have not attained goals due to difficulty in locating brood fish. As a result of not attaining the goals, the stocking level has not exceeded 200,000 (1996) juveniles. In 1996, sockeye salmon eggs were not collected at Laura Lake due to adequate adult escapement. In 1997, we propose an egg take to provide for stocking Laura Lake in 1998; however, the number of eggs collected will be determined by the adult escapement and may be reduced or discontinued inseason if adequate natural spawners return.

In 1995 and 1996, Buskin River coho salmon were reared at PCH to provide fry for road system stocking to enhance sport fishing opportunities. In addition, Buskin River coho salmon eggs were used for several classroom incubation programs in Kodiak area schools. Prior to 1995, Little Kitoi and Monashka Creek coho were used for these programs, respectively. The use of Buskin River (Chiniak Bay stock) coho was recommended by the ADF&G genetics staff because stocking locations are in the Chiniak Bay area. In 1997, we propose continuing these coho stocking programs using Buskin River coho as the brood source.

Since PCH is a relatively new facility, this management plan will continue to evolve in an effort to bring the egg numbers up to maximum incubation capacity. There are many factors that have, and will continue to bring changes to this document. Inseason lake productivity assessment may result in adjustments to stocking densities in order to maintain optimal stocking levels. This management plan also includes proposals which are in the process of review as required by the Fish Transport Permitting or budget allocation processes.

1997 RELEASES

Early Run Sockeye Salmon: Afognak Lake Donor Stock

Table 1 describes 1996 egg takes, planned releases in 1997 (and 1998), projected returns in 2000 and 2001, and the status of Fish Transport Permits (FTP). The stocking levels for 1997 will be adjusted inseason after limnological analysis of zooplankton data collected at each lake and due to rearing limitations at PCH (i.e. how many of each life stage could be cultured). Appendix A describes the planning process for development of stocking levels, and includes the 1996 Annual Management Plan (AMP), limnology recommendations, and final planned stocking levels. The projected stocking levels in this plan have been modified in some instances from the final planned levels as result of changes in fry survival.

Hidden, Crescent and Sorg Lakes are projected to be stocked in 1997 with 400,000, 400,000, and 150,000 juveniles, respectively. These levels are consistent with the 1996 PCH AMP and prior Fish Transport Permits. The stocking levels for Little Waterfall and Little Kitoi Lakes were reduced from 1996 PCH AMP levels (300,000 and 150,000) to 200,000, and 100,000 presmolt, respectively. These reductions were a result of inseason limnological information indicating a more conservative stocking level would benefit the zooplankton communities of each lake. As previously mentioned, increased survivals resulted in excess early run juveniles. These fish (~500,000) will be stocked into Afognak Lake (400,000) in 1997 and Sorg Lake (100,000) as age-1 smolt in 1998 (Appendix B). Fish releases were not projected for Afognak Lake in 1997; however, the lake is used each year as an alternate release site for Afognak Lake salmon (destined for other projects) if an unforeseen situation arises during incubation and rearing or if stocking densities change due to inseason limnology analysis. The Sorg Lake smolt release in May 1998 will be the initiation of a new program designed to provide increased survival to the adult life stage while minimizing grazing of the zooplankton population in the lake. Smolt will be released in the lake 1-2 weeks prior to the peak outmigration period (last week of May) of the brood stock (Afognak Lake) to allow a sufficient time period for freshwater imprinting. A total of ~1.65 million enhanced early run (Afognak Lake stock-1996 brood year) juveniles will be stocked in 1997 (and 100,000 from the 1996 brood year stocked in 1998 as smolt in Sorg Lake).

Adult returns from enhanced early run (Afognak Lake brood stock) stocking in 1997 (and 1998 - Sorg Lake) are projected, (based on survivals summarized in Appendix C) to be ~126,000 fish. Of these, ~89,000 will return in 2000 and 37,000 in 2001. The largest return (34,000) is expected at Sorg Lake and the smallest at Little Kitoi Lake (10,000). The run timing of these returns should be similar to Afognak Lake sockeye salmon (brood source), with runs beginning in late May, peaking in mid June, ending by early July (Figure 2a). This run timing affinity has been observed at terminal harvest areas at both Foul Bay and Waterfall Bay (L. Waterfall Lake) in 1995 and 1996 (Figure 2b).

Early Run Sockeye Salmon: Malina Lake Donor Stock

In 1997, juvenile sockeye stocking projections for Malina Lake were reduced considerably from the 1996 AMP levels. We project 300,000 fry and 200,000 presmolt will be stocked compared to a

planned level of 1.1 million juveniles (850,000 fry and 250,000 presmolt). The stocking level was adjusted to account for natural fry recruitment and zooplankton biomass trends and is contingent upon continued lake enrichment in 1997.

Adult returns as a result of rehabilitation (stocking) efforts of this early run stock in 1997 are expected to be ~29,000 sockeye. The age of return has, on average, been a 50:50 mix of two and three ocean fish. Thus, ~14,500 adults should return in both 2000 and 2001. The Malina Lake sockeye run timing is similar to the Afognak Lake stock with fish first appearing at the weir in early June (the weir is located several miles from salt water and adults have been observed one week earlier at the stream terminus) and peaking by mid June (Figure 3); however, there also appears to be a second peak in early July. A small portion of escapement occurs throughout the remainder of July and into August; the weir is pulled by mid August.

Late Run Sockeye Salmon: Sallery Lake Donor Stock

In 1997, approximately, 150,000 Sallery Lake sockeye fry will be stocked into Ruth Lake. This represents an increase of 25,000 from the 1996 AMP as a result of increased egg to fry survivals. This level of stocking is not expected to cause any adverse effects on the food base (zooplankton) in the lake since it ranks high in zooplankton density and abundance.

Approximately 6,000 adults are expected to return in 2000 and 2001 as a result of stocking Ruth Lake. The run timing of these fish should be similar to Sallery Lake sockeye, with the initial run beginning in late June, peaking in mid to late July, and ending in mid August (Figure 4a).

Late Run Sockeye Salmon: Upper Station Lake Donor Stock

Upper Station sockeye will be stocked into Spiridon and Jennifer Lakes in 1997. The 1997 stocking level for Spiridon Lake of 6 million sockeye fry is consistent with the 1996 AMP. We project approximately 500,000 late run fry available to stock Jennifer Lake in 1997. This is an increase from the planned stocking level as outlined in the 1996 AMP of 250,000; limnology data indicates the lake will support these excess fry.

We project 260,000 adults will return in 2000 and 2001; 182,000 in 2000 and 78,000 in 2001. Of this total, 240,000 will return to Spiridon and 20,000 to the Kitoi Bay area (Jennifer Lake). Run timing is expected to be similar to 1994-1996 runs to Spiridon Lake; initial runs have been observed in mid July, peaking in mid August, and declining by early September (Figure 4b). This run timing is very similar to the Upper Station late run donor stock (Figure 4a).

In summary, in 1997 we expect PCH to stock ~2.3 million early run sockeye juveniles, producing ~155,000 adults; ~6.7 million late run sockeye juveniles, producing ~266,000 adults. This equates to a grand total of ~8.9 million juvenile sockeye stocked and production of ~421,000 adults.

For the above projects, FTP's are current except for stocking smolt in Sorg Lake in May 1998 and stocking presmolt in Malina Lake in October 1997. FTP applications for Sorg and Malina Lakes will be submitted by KRAA to the ADF&G permitting coordinators in Juneau for review and

approval by the Commissioner of ADF&G. Approval is expected in advance of all stocking in 1997 and 1998.

All sockeye will be transported by air as fed fry, fingerling, pre-smolt, or smolt to the remote lakes previously specified. Stocking of fed fry and fingerlings will correspond to the timing of each lake's plankton bloom. Fry will be released at the lake surface. Pre-smolt will be released by air dropping in late October or early November, just prior to lake freeze up to minimize the likelihood of plankton cropping. Smolt will also be released by air dropping in May.

Coho Salmon : Buskin River Donor Stock

Table 2 describes 1996 coho salmon egg takes, 1997 planned releases, projected adult returns in 1999 and 2000, and the status of FTP's.

Approximately 128,000 coho salmon fry are expected to be released at seven lakes located near the Kodiak Island road system. These lakes include: Mayflower (13,000), Island (45,000), Dark (15,000), Mission (24,500), Potato Patch (19,000), Southern (7,000), and Pony (4,200) Lakes. A small number of Buskin River coho salmon eggs will be used for educational programs in the local schools within the Kodiak Island Borough school system. There are currently eight school teachers with Sci-Ed permits that allow use of up to 200 eggs each from this stock. Eggs incubated in classroom incubators will be released (~600 fry) into Potato Patch Lake under the supervision of the PCH Manager. The exception to this may be Old Harbor, Ouzinkie, Akhiok, and Port Lions schools in which resultant fry, (if they receive a permit for a Sci-Ed project), will be destroyed.

In June, coho fry will be transported from PCH by a truck-mounted transport tank to each stocking location, except for Southern Lake where fry will be transported via float plane. Adults returning in 1999 and 2000 are expected to number ~1,950, with the majority (1,700) returning in 1999. Run timing should be similar to Buskin River coho, with fish returning in mid August, peaking in early September, and declining by late September.

Permits (FTP) are valid for all coho road system stocking locations until 12/31/03. All of the school project (scientific educational) permits expire 12/31/97 and new permits will be required for any remaining school projects prior to release of fry in 1997.

1998 RELEASES

Early Run Sockeye Salmon: Afognak Lake Donor Stock

Table 3 describes 1997 egg takes, planned releases in 1998 and 1999, projected returns in 2001 and 2002, and the status of Fish Transport Permits (FTP). The stocking levels for 1998 may be adjusted inseason as a result of limnological analysis of zooplankton data collected at each lake and rearing limitations at PCH (i.e. how many of each life stage could be cultured). Appendix B describes the planning process for the development of 1998 stocking levels. The 1998 stocking levels may be

further modified from the planned levels once eggs are collected in 1997 to account for differing egg to fry survivals.

The stocking levels of early run Afognak Lake fry planned for 1998 are as follows: Hidden Lake-250,000 fry and 150,000 presmolt; Little Waterfall Lake-300,000 presmolt; Crescent Lake-400,000 fry; Sorg Lake-150,000 presmolt; and Jennifer Lake-500,000 fry. Approximately, 100,000 smolt (Afognak Lake brood year 97) will be released in Sorg Lake in 1999; the same stocking level as in 1998. The stocking level for Little Waterfall Lake represents an increase from the projected stocking level in 1997 (200,000); however, is the same as planned in the 1996 AMP and will also be contingent upon continued lake fertilization in 1998. Jennifer Lake will replace Little Kitoi as an early run stocking location in 1998. The intent of this modification is to provide separation of early and late sockeye runs. The desired goal being to have only late run sockeye returning to Little Kitoi Lake. The proposed stocking level (500,000) for Jennifer Lake is the minimum number recommended by the limnological analysis in 1996 (500,000-750,000). In 1997, increased survivals resulted in excess early run juveniles (~500,000) from the Afognak Lake brood source which are expected to be stocked back into Afognak Lake in 1997. Fish releases are not projected for Afognak Lake in 1998; however, the lake will be used as an alternate release site for Afognak Lake juvenile sockeye salmon if stocking densities are reduced for other projects due to inseason limnology analysis. Afognak Lake has responded favorably to lake enrichment and zooplankton density and biomass is expected to be sufficient to stock up to 500,000 sockeye fry in 1998 if necessary. Limnological monitoring will continue in 1997 and 1998 to determine if this stocking level should be modified. A total of ~1.8 million enhanced early run (Afognak Lake stock) juveniles will be stocked in 1998 (an additional 100,000 will be stocked from the 1997 brood year into Sorg Lake in 1999).

Adult returns from enhanced early run stocking in 1998 are projected, (based on survivals summarized in Appendix C) to be ~136,000 fish. Of these, ~96,000 will return in 2001 and 40,000 in 2002. The largest return (37,000) is expected at Waterfall Bay (Little Waterfall Lake) and the smallest at Crescent Lake (16,000). The run timing of these returns should be similar to Afognak Lake sockeye salmon (brood source), with runs beginning in late May, peaking in mid June and ending by early July (Figure 2a). This run timing has been observed at both Foul Bay and Waterfall Bay (Little Waterfall Lake) in 1995 and 1996 (Figure 2b) as a result of stocking of Afognak Lake fry.

Early Run Sockeye Salmon: Malina Lake Donor Stock

Juvenile sockeye stocking projections for Malina Lake in 1998 are less than the 1996 AMP levels. We propose 500,000 (300,000 fry and 200,000 presmolt) juveniles will be stocked compared to a the 1.1 million juveniles proposed in the 1996 AMP. This reduction is based on the current plan for stocking the lake in 1997 (as a result of limnological analysis of the zooplankton population) and the predicted increase in escapement expected in 1997. Stocking at this level will be contingent upon continued lake fertilization 1998. If fertilization ends, fry stocking may be reduced or discontinued in lieu of presmolt stocking.

Adult returns as result of rehabilitation (stocking) efforts of this early run stock in 1998 are expected to be ~26,000 sockeye. The age of return has, on average, been a 50:50 mix of two and

three ocean fish. Thus, ~13,000 adults should return in both 2001 and 2002. The Malina Lake sockeye run returns similarly to the Afognak Lake stock with fish first appearing at the weir in early June (the weir is located several miles from salt water and adults have been observed one week earlier at the stream terminus) and peaking by mid June (Figure 3); however, there also appears to be a second peak in early July. A small portion of escapement occurs throughout July and into August; the weir is pulled by mid August.

Early Run Sockeye Salmon: Laura Lake Donor Stock

We propose 500,000 juvenile sockeye be stocked in Laura Lake in 1998; 300,000 fry and 200,000 presmolt. In 1996 eggs were not collected at Laura Lake because the escapement of adult sockeye met the upper escapement goal (40,000). In 1997, if escapement is less the mid-point goal of 30,000 (Honnold and Edmundson 1993), an egg take will proceed. The fry stocking goal may be reduced based on the escapement level and lake productivity (zooplankton abundance and biomass). Similar to Malina, if lake enrichment is discontinued at Laura Lake in 1998, then fry stocking numbers may need to be reduced and only presmolt stocked. The lake's zooplankton density and biomass will be monitored in 1997 and 1998 to determine if adjustments to the stocking plan are warranted.

Adult returns as a result of rehabilitation (stocking) efforts of this early run stock in 1998 are expected to be ~26,000 sockeye adults in 2001 (18,000) and 2002 (8,000). Laura Lake sockeye runs begin in early June and peak by mid June (Figure 5). A small portion of escapement occurs in July and early August.

Late Run Sockeye Salmon: Saltery Lake Donor Stock

We propose that approximately 7 million Saltery Lake sockeye fry be stocked into Spiridon Lake and 300,000 into Ruth Lake in 1998. This represents an increase from the 1996 plan (AMP) of 1 million fry for Spiridon Lake and 175,000 fry for Ruth Lake. This level of stocking is contingent upon the stability of the food base (zooplankton) in the lakes as observed in 1997. If any negative response is observed in the lake's zooplankton community as result of 1997 stocking levels (~6 million fry at Spiridon Lake and 150,000 fry at Ruth Lake), the proposed levels will be reduced. Inseason monitoring of the zooplankton community will be conducted in 1997 and 1998 and seasonal trends will be analyzed prior to the Saltery Lake egg take. Fish releases are not projected for Saltery Lake in 1998; however, the lake will be used as an alternate release site for Saltery Lake juvenile sockeye salmon (destined for Spiridon or Ruth Lakes) if an unforeseen situation arises during incubation and rearing or if stocking densities change due to inseason limnology analysis. That is, if egg-to-fry survival is high, then more than 7.3 million fry could result. This number of fry would exceed planned stocking levels at Spiridon Lake (7 million) and Ruth Lake (300,000). Excess fry could also result from a reduction in stocking levels if end of season limnological analysis indicates declining zooplankton density and biomass trends in Spiridon and Ruth Lake. The excess fry would be stocked into Saltery Lake if either of these scenarios occur. Limnology data will determine the number and life stage that can be backstocked. The release of a late fall presmolt may be necessary if declining zooplankton trends are observed at Saltery Lake. This stocking strategy has been observed to reduce the grazing impacts on the zooplankton communities

in lakes (Honnold et al 1996). The release of presmolt at Ruth Lake may also be an option for excess fry, depending on limnology data. The final stocking plan will be determined in August 1997 and additional FTP's will be submitted to provide for the above stocking options.

Approximately 280,000 and 12,000 adults are expected to return as result of stocking of Spiridon and Ruth Lakes, respectively, in 2001 and 2002. These fish are projected to have similar run timing as Saltery Lake sockeye, with the initial run beginning in late June, peaking in mid to late July and ending in mid August (Figure 4a).

Late Run Sockeye Salmon: Upper Station Lake (Little Kitoi Lake) Donor Stock

Late run Upper Station sockeye will be used as a brood source for the Spiridon Lake stocking project if permitting requirements for use of Saltery Lake sockeye as the primary donor stock are not approved. Upper Station Lake late run sockeye have been used since 1989 for brood stock development at Little Kitoi. This egg take may not occur if the sockeye run at Little Kitoi Lake is sufficient to provide the necessary eggs for the project. The proposed stocking level for 1998 is the same as described above for the Saltery Lake brood source.

Adult returns for the project are projected to be similar to those described for the Saltery Lake brood stock stocking. The adults would be expected to return the same as the 1994-1996 runs to Spiridon Lake; initial returns have been observed in mid July, peaking in mid August and declining by early September (Figure 4a and 4b). This run timing is very similar to Upper Station late run.

All sockeye will be transported by air as fed fry, fingerling, pre-smolt, or smolt to the remote lakes previously specified. Stocking of fed fry and fingerlings will correspond to the timing of each lake's plankton bloom. Fry will be released at the lake surface. Pre-smolt will be released by air dropping in late October or early November, just prior to lake freeze up to minimize the likelihood of plankton cropping. Smolt will also be released by air dropping in May.

In summary, in 1998 we expect PCH to stock ~2.8 million early run sockeye juveniles (and 100,000 in 1999 from brood year 97), producing ~188,000 adults; ~7.3 million late run sockeye juveniles, producing ~292,000 adults. This equates to a grand total of ~10.2 million juvenile sockeye stocked from brood year 1997 which is expected to produce a total return of ~480,000 adults.

For the above projects, FTP's are current for all stocking except presmolt into Malina Lake and smolt into Sorg Lake. Applications for these permits will be submitted by KRAA to the ADF&G permitting coordinators in Juneau for review and approval by the Commissioner of ADF&G. Approval is expected in advance of all egg takes and stocking. These projects are considered on going with adjustments being requested as knowledge of each system increases. In 1998, new FTP applications will be needed for most PCH projects, as well as stocking Saltery Lake fry into Spiridon Lake. Also, new permits will be needed to use Saltery or Ruth Lakes as sites for back stocking excess Saltery fry or presmolt. The remainder of the permits will be amended to reflect changes in stocking numbers and juvenile life stages.

Coho Salmon : Buskin River Donor Stock

Table 4 describes 1997 coho salmon egg takes, 1998 planned releases, projected adult returns in 2000 and 2001, and the status of FTP's.

Approximately 128,000 coho salmon fry are expected to be released into seven lakes located near the Kodiak Island road system. These lakes include: Mayflower (13,000), Island (45,000), Dark (15,000), Mission (24,500), Potato Patch (19,000), Southern (7,000), and Pony (4,200) Lakes. A small number of Buskin River coho salmon eggs will be used for educational programs in the local schools within the Kodiak Island Borough school system. There are currently eight school teachers with Sci-Ed permits that allow use of up to 200 eggs each from this stock. Eggs incubated in classroom incubators will be released (~600 fry) into Potato Patch Lake under the supervision of the PCH Manager. Sci-Ed permits may also be issued to remote schools (Old Harbor, Ouzinkie, Akhiok, and Port Lions) where the resultant fry will be destroyed.

In June, coho fry will be transported from PCH by a truck-mounted transport tank to each stocking location, except for Southern Lake where fry will be transported via float plane.

Adults returning in 2000 and 2001 are expected to number ~1,900, with the majority (1,700) returning in 2000. Run timing should be similar to Buskin River coho, with fish returning in mid August, peaking in early September and declining by late September.

Permits (FTP) are valid for all road system stocking locations until 12/31/03; however, most school projects (scientific educational) permits have been renewed until 12/31/97 but a few may need to be renewed prior to release of fry.

SPIRIDON LAKE BROOD STOCK CHANGE

Local ADF&G, FWS, and KRAA staff have determined that Sallery Lake is a preferred brood stock for Spiridon Lake stocking (Honold *in press*). The transition from Upper Station (Little Kitoi) to Sallery Lake as the primary brood source is scheduled to begin with the 1997 egg take (1998 stocking year) if the change is approved by the Commissioner of ADF&G in conjunction with the Kodiak National Wildlife Refuge staff.

The rationale for changing the brood stock from Upper Station Lake to Sallery Lake includes the following:

- The use of Sallery Lake sockeye salmon brood stock will reduce the incidental harvest of Spiridon River sockeye, pink, and chum salmon stocks due to greater separation in the run timing between Sallery Lake and Spiridon River salmon stocks (Appendix D and E). The sockeye run at Telrod Cove (Spiridon Bay Terminal Harvest Area) as a result of stocking Sallery Lake sockeye into Spiridon Lake is projected to occur from 4 July through 9 August, peaking on 22 July (ADF&G 1994). The run (based on the harvest in statistical area 254-40) using late run Upper Station as brood stock has occurred from ~24 July through 4 September, peaking ~15 August (Honold *in press*). The incidental harvest of chum salmon has been

minimal in the THA; however, the incidental harvest of pink salmon has been substantially larger, occurring primarily during the peak of the sockeye fishery in mid August. The earlier run timing using SALTERY Lake brood stock is expected to reduce the incidental harvest of pink salmon in the THA. Chum salmon harvested in Spiridon Bay (statistical area 254-40 which includes Spiridon Bay and Kuliuk Cape harvests) has historically occurred from June through August, peaking in late July. This trend is not expected to change; however, the harvest will be monitored annually to assess any substantial change. Few chum salmon have been observed in the THA and appear to be more direct in the movements into Spiridon River than the pink salmon run. Thus, the incidental harvest of chum salmon in the THA is not expected to increase with the change in sockeye salmon run timing. The small sockeye run (~200-450 escapement) to Spiridon River has been observed inriver from late August into early October (T. Chatto, USFWS, personal communication). This would indicate that the earlier Spiridon Lake (SALTERY brood stock) sockeye run timing would decrease any incidental harvest of Spiridon River sockeye since fish are likely in route to the river in early to mid August.

- The run timing will provide improved opportunity for escapements necessary for the Little Kitoi Bay brood stock development program (Figure 6). Sockeye runs using SALTERY Lake brood stock would be expected to return as chum salmon abundance in the Kitoi Bay fishery was declining, and prior to the majority of pink salmon returns. This would provide a window to allow sufficient escapement into Little Kitoi Lake for brood stock requirements.
- The utilization of excess escapement of SALTERY Lake sockeye will benefit the SALTERY Lake zooplankton community which has experienced a decline in density and biomass in recent years because of excess escapements. Excluding 1992 (~21,000 escapement), sockeye escapement (averaged 53,400) has exceeded the upper BEG (40,000) annually since 1991. The 1996 zooplankton density and biomass in SALTERY Lake declined four-fold compared to 1995 (Honnold in press).
- The cost benefit ratio of the program will improve as a result of decreased egg take costs at SALTERY Lake. SALTERY Lake is located much closer to PCH than Upper Station Lakes (Figure 1). Consequently, air charter costs would be reduced for the egg takes. SALTERY Lake is also accessible by four-wheeler from the Kodiak road system which would allow egg takes to proceed if weather prevents flying. This would reduce the time required for the egg take and associated remote camp, personnel, transportation, and logistical costs.

SOCKEYE SALMON HARVEST AND MANAGEMENT

The 1997 estimated sockeye salmon run to systems as a result of PCH stocking (in conjunction with lake enrichment at Afognak, Malina, Laura, L. Waterfall, and Laura Lakes) is projected as follows (Honnold, unpublished report):

Early Run

Hidden Lake	barrier lake	17,000; range 10,000-23,000
Crescent Lake	barrier lake	14,000; range 8,000-20,000
L. Waterfall Lake	barrier lake	33,000; range 20,000-46,000
L. Kitoi Lake	barrier lake	23,000; range 14,000-32,000
Afognak Lake	brood stock source	7,000; range 4,000-12,000
Malina Lake	rehabilitation project	12,000; range 6,000-18,000
Laura Lake	rehabilitation project	1,600; range 800-2,500

Late Run

Spiridon Lake	barrier lake	164,000; range 98,000-230,000
Jennifer Lake	barrier lake	10,000; range 5,000-15,000

Hidden, Crescent, Little Waterfall, Little Kitoi, Spiridon, and Jennifer Lakes are barrier systems without native salmon runs. All sockeye returning to these systems are available for harvest. Afognak, Malina, and Laura Lakes have anadromous salmon runs; hatchery produced fish will intermingled with wild fish. Using an average exploitation rate of 60% (Chapman 1986) we would expect 4,200 Afognak Lake, 7,200 Malina Lake, and 1,000 Laura Lake sockeye to be harvested as result of hatchery production, the remainder would go toward escapement goals. Directed fisheries on Afognak, Malina, and Laura Lakes sockeye salmon runs will only occur if escapement goals are achieved.

Release Site: Hidden Lake

The Foul Bay harvest strategy is designed to allow for the harvest of sockeye salmon returning to Foul Bay produced from the Hidden Lake enhancement project and to provide for the protection of wild salmon stocks returning to or passing through the Northwest Afognak Section of the Afognak District (Figure 7).

Hidden Lake sockeye runs will be harvested in special openings in the Foul Bay Terminal Harvest Area (THA; Figure 8). Fishing time directed at returning sockeye salmon will be dependent on a minimum escapement of 3,000 pink salmon into Hidden Lake Creek. However, most fishing time, for Hidden Lake sockeye is expected to occur prior to the arrival of pink salmon in late July. There is no escapement requirement for sockeye salmon in Hidden Creek as the lake is inaccessible due to a large barrier falls. The sockeye salmon harvest is expected to occur primarily in the Foul Bay THA, however, some sockeye salmon may be harvested in the Northwest Afognak Section (Figure 7). Sockeye salmon harvested between July 6th and July 25th will count towards the 15,000 fish threshold level as indicated in the North Shelikof Strait Sockeye Salmon Management Plan (5 AAC 18.363, ADF&G 1996).

The Environmental Assessment of this project (Hidden Lake is part of Kodiak National Wildlife Refuge) required a sockeye salmon escapement of 7,000 (~10% of the total run) into Hidden Creek for Brown Bear food (KNWR 1991). This escapement requirement was discontinued in 1996; thus, all returning sockeye salmon are available for harvest (no brood stock requirements). The THA,

addressed in this management plan, will be used to harvest sockeye salmon runs produced from stocking of Hidden Lake.

The Foul Bay THA will address that area of Foul Bay east of 152° 47'12" West long. By regulation, the legal gear type for the THA is seine gear only.

When a harvestable surplus of enhanced sockeye salmon are documented in the THA, continuous fishing periods may be announced by ADF&G. A weir will be deployed in 1997 to assure that all Hidden Lake sockeye salmon will be harvested.

ADF&G recognizes that some incidental harvest of natural stocks could occur in this area while the fishery is managed to harvest the enhanced Hidden Lake sockeye salmon. The Department intends, however, to prevent jeopardizing the escapement of wild salmon stocks. To avoid harvest of wild stocks and target Hidden Lake sockeye salmon, the Department may need to adjust the size of the THA opened to commercial fishing.

Release Site: Crescent Lake

The purpose of the Crescent Lake stocking project is to provide enhanced sockeye salmon for harvest as they return to Crescent Lake and adequate protection for escapements of wild salmon, including Barabara Lake sockeye salmon (stream number 333) and other stocks migrating in the area (Figure 9).

The harvest of Crescent Lake sockeye salmon is expected to occur during normal fishing periods targeting early run sockeye, pink and chum salmon in the Central Section (statistical areas 259-36, 259-37, 259-38) of the Northwest Kodiak District (Figure 7). Special openings are not expected to occur within the THA (Settler Cove; Figure 9). The fishery opens in the Central Section of the Northwest Kodiak District on June 9 for 33 hours and again on June 14 and often remains open until July 10 (depending on the run strength of early run Karluk Lake sockeye). In 1995 and 1996, this fishing time was sufficient to harvest all Crescent Lake returns. The THA will be opened in 1997 if large numbers of sockeye are not harvested during fishery openings in the above mentioned fishing districts and are observed in the Settler's Cove area. Brood stock collection is not required for this project so all fish will be available for harvest. A barrier net is not necessary for this project since natural barriers prevent salmon access to the lake and villagers of Port Lions utilizes all inriver escapement for subsistence purposes.

Release Site: Waterfall Lakes

The Waterfall Bay harvest strategy will allow for the harvest of enhanced sockeye salmon returning to Waterfall Bay and provide safe guards to assure that escapement goals for wild salmon stocks are met.

The sockeye salmon harvest is expected to occur in the Perenosa Bay statistical area of the Northwest Afognak Section (Figure 7). A THA is required to provide for an orderly harvest of enhanced sockeye which have migrated past the traditional commercial fishing areas of the

Perenosa Bay area (Figure 10). Since escapement and brood stock are not required all returning enhanced sockeye salmon will be available for harvest. When a harvestable surplus of enhanced sockeye salmon is documented in the THA, continuous fishing periods may be announced by the Department. A barrier seine or weir will be deployed again in 1997 to assure that all Waterfall Lake sockeye salmon will be harvested.

The Waterfall Bay THA will address all waters seaward of the stream terminus of stream number 251-822 (58°23'57" N.lat., 152°30'12" W.long.) that are within a one nautical mile arc. By regulation, the legal gear type for the THA is seine gear only.

ADF&G recognizes that some incidental harvest of wild salmon stocks could occur in this area while the fishery is managed to harvest the enhanced Waterfall Lake sockeye salmon. The Department intends, however, to prevent jeopardizing the escapement of wild salmon stocks. To avoid harvest of natural stocks and target Waterfall Lake sockeye salmon, the Department may need to adjust the size of the terminal area opened to commercial fishing. Wild stocks that could potentially be in the Waterfall Bay THA include Pauls (Laura) and Portage Lake sockeye stocks that have similar run timing as the Waterfall stock; all three lakes are located in Perenosa Bay (Figure 10).

Release Site: Little Kitoi Lake

The 1997 Little Kitoi Lake run will be harvested incidentally during sockeye and chum salmon fisheries in the Kitoi Bay, Izhut, and Duck Bay Sections of the Afognak District (Figure 7). The harvest management strategy is described in the 1997 Kitoi Bay Hatchery AMP (*in press*). Brood stock collection is not required for this project, and if the proposed brood stock change from Upper Station to Sallery Lake is approved, all sockeye returning to Kitoi Bay will be available for harvest during the brood stock transition period.

Release Site: Afognak Lake

The 1997 Afognak Lake run, as a result of PCH supplemental stocking, will be harvested during normal fishing periods in the Southeast Afognak Section (Figure 7). Approximately, 1,610 sockeye salmon will be required in 1997 for brood stock for fry stocking projects at Hidden, Little Waterfall, Crescent, Sorg, and Jennifer Lakes.

Release Site: Malina Lake

The 1997 Malina Lake run, as a result of PCH supplemental stocking, will be harvested during normal fishing periods in the Southwest and to a lesser extent in the Northwest Sections of the Afognak District (Figure 7). If a harvestable surplus occurs at Malina Lake and it appears that optimum escapement levels will be exceeded, inseason closed water adjustments for Malina Lakes systems will occur. Approximately, 454 sockeye salmon will be required for brood stock in 1997.

Release Site: Laura Lake

Sockeye salmon escapement is forecast to be less than the minimum goal (20,000) at the Laura Lake system in 1997; however, if a harvestable surplus of sockeye salmon occurs, they will be harvested during normal fishing periods in the Perenosa Bay area of the Northwest Afognak District (Figure 7). If it appears that optimum escapement levels will be exceeded, inseason closed water adjustments in Paul's Bay may occur. Approximately, 454 sockeye salmon will be required for brood stock in 1997.

Release Site: Spiridon Lake

In 1995 the Department reduced the size of the Spiridon Bay THA opened to commercial fishing to avoid harvest of natural stocks and/or target more discretely on Spiridon Lake sockeye salmon (Figure 11). As the fishery evolves, additional adjustments may be necessary.

The Spiridon Bay harvest strategy is designed to allow for the harvest of enhanced sockeye salmon returning to Spiridon Lake (Telrod Cove; Figure 11) and to provide adequate protection for escapements of wild salmon stocks returning to streams in the area (Spiridon River). The original intent of this enhancement project was for the harvest of the returning enhanced salmon to occur in traditional commercial fishing areas of the Northwest Kodiak District during openings directed to harvest Karluk Lake sockeye and west-side pink and chum salmon stocks (Figure 7). A THA, however, is required to provide for an orderly harvest of enhanced sockeye which have migrated past the traditional commercial fishing areas of the Northwest Kodiak District. A series of falls prevents salmon from entering Spiridon Lake and a barrier seine prevents sockeye salmon from entering Telrod Creek; thus all sockeye in the THA are available for harvest.

In 1995 by emergency order regulation and in 1996 by normal regulation (5 AAC 18.366; ADF&G 1996), the Spiridon Bay THA, was reduced in size to included all waters of Telrod Cove north of a line extending from Stream Point at 57° 39' 00" N. lat., 153° 38' 30" West long. to the opposite shore at 57° 38' 48" N. lat., 153° 37' 42" West long. When a harvestable surplus of enhanced sockeye salmon is documented in the THA, continuous fishing periods will be announced by the Department. Terminal harvest openings will be coordinated, if possible, to occur at the beginning of fishing periods scheduled for management sections in the Northwest Kodiak District. By regulation, the legal gear type for the THA is seine gear only.

ADF&G recognizes that some incidental harvest of wild stocks could occur in this area while the fishery is managed to harvest the enhanced Spiridon Lake sockeye salmon. The Department intends, however, to prevent jeopardizing the escapement of wild salmon stocks; specifically those that return to Spiridon River. Brood stock for this project are collected at Upper Station, Little Kitoi or Saltery Lake. A proposal to collect eggs solely from Saltery sockeye is being considered for 1997.

Release Site: Jennifer Lake

The 1997 Jennifer Lake run will be harvested incidentally during pink and coho salmon fisheries in the Kitoi Bay, Izhut, and Duck Bay Sections of the Afognak District (Figure 7). The harvest management strategy is described in the 1997 Kitoi Bay Hatchery AMP (*in press*).

Jennifer Lake is not anadromous; barrier falls prevent salmon migration into the lake. Brood stock will not be collected in 1997 and all salmon will be available for harvest.

The sockeye salmon run timing is described in preceding sections of this plan for each release (and return) site (Figures 2-5).

General Conditions of Harvest Management, 1997

The primary objective of PCH is to provide salmon for common property fisheries. It is recognized that a joint effort among ADF&G and KRAA is necessary to continue the operation of the hatchery at full production levels.

The ADF&G Kodiak Area Management Biologist will manage the fishery based on runs of wild stocks. Enhanced sockeye salmon are expected to be harvested incidental to fisheries targeting other stocks unless otherwise specified in terminal harvest areas or when simple closed waters adjustments at terminal areas are announced.

When brood stock is taken from spawning systems with established escapement requirements, the number of fish used will not reduce the wild salmon spawning population below the minimum escapement goals for that system.

Terminal Harvest Area Description , Conditions, and Harvest Strategies: Enhanced Runs

A THA is not needed for PCH cost recovery. In 1997, THA's will be used as a management tool for harvesting sockeye salmon runs at Spiridon, Hidden, and Waterfall Lakes. The Crescent Lake THA may be used if excess sockeye salmon are observed in Settler's Cove; however, the majority of the harvest is expected to occur during normal fishing periods in the Central Section of the Northwest Kodiak District.

Enhanced sockeye salmon returning to Spiridon Lake will be harvested in the west side pink salmon fishery and in special openings in Telrod Cove (THA). A run of 164,000 sockeye salmon is projected for 1997; none will be needed for brood stock, escapement or cost recovery, (all will be available for harvest).

Harvest information will be monitored through the ADF&G fish ticket information collected from each buyer. Scale samples will be taken from 240 adult fish per week (600 total) from the Telrod Cove openings. A total of 600 scale samples will be collected per week either at the Port of Kodiak or from the commercial catch from the westside Kodiak Districts in a coordinated effort between Development and Research sections of ADF&G.

Hidden Lake sockeye salmon will be harvested in the Foul Bay THA. A run of 17,000 sockeye salmon is projected for 1997; none will be needed for brood stock, escapement or cost recovery, (all will be available for harvest).

Waterfall Lake sockeye salmon will be harvested during normal commercial fishing periods in Perenosa Bay and in the Waterfall Bay THA. A run of approximately 33,000 sockeye salmon is projected for 1997; none will be needed for brood stock, escapement or cost recovery (all will be available for harvest).

Harvest information from salmon runs at Foul and Waterfall Bays will be monitored through the ADF&G fish harvest ticket information collected from each buyer. Scale samples will be collected by Development section personnel from 240 adult fish per week (600 total) at each location during normal fishing periods.

Crescent Lake sockeye salmon runs will be harvested in the Central Section of the Northwest Kodiak District. Special openings in the Crescent Lake THA are not anticipated. A run of 14,000 sockeye salmon is projected in 1997; none will be needed for brood stock, escapement or cost recovery, (all will be available for harvest).

Harvest information from the sockeye salmon run at Crescent Lake will be monitored through the ADF&G fish harvest ticket information collected from each buyer. Currently, a scale sampling program is not planned in 1997.

Terminal Harvest Areas may be needed in the future to harvest returns to Jennifer, Sorg and Ruth Lakes without decreasing early run (Jennifer and Sorg Lakes) brood stock requirements for Pillar Creek Hatchery and late run (Ruth Lake) brood stock requirements for Kitoi Bay Hatchery. Early run brood stock may be required for PCH if the Afognak Lake run does not provide minimum escapement. The addition of THA's may improve management for late run brood stock requirements for development of Sallery Lake stock at KBH.

Other Harvest Areas Description , Conditions, and Harvest Strategies: Enhanced Runs

Little Kitoi early run and Jennifer Lake late run sockeye salmon will be harvested in the Kitoi, Izhut and Duck Bay Sections of the Afognak District incidentally during the common property salmon fishery. A run of 23,000 early run and 10,000 late run sockeye salmon are projected to return in 1997 as result of lake stocking at these sites. If the proposed change in brood stock from Upper Station to Sallery Lake occurs, all of the returning salmon (Upper Station origin) will be available for harvest. Brood stock and escapements are not required until the year 2000 when sockeye of Sallery stock would be expected to return to Kitoi Bay.

Harvest information from these sockeye salmon runs will be monitored through the ADF&G fish ticket harvest information collected from each buyer. A scale sampling program will be conducted in 1997 to identify each stock.

Harvest Areas Description , Conditions, and Harvest Strategies: Rehabilitated Runs

The 1997 Afognak Lake run will be harvested during normal fishing periods in the Southeast Section of the Afognak District.

The 1997 Malina Lake run will be harvested in the Southwest and to a lesser extent in the Northwest Sections of the Afognak District.

If a harvestable surplus of sockeye salmon occurs at Laura Lake, they will be harvested during normal fishing periods in the Perenosa Bay area of the Northwest Afognak Section.

Sockeye salmon will be required for brood stock at each of these systems in 1997 (See Below).

1997 ESCAPEMENT GOALS, AND BROOD STOCK REQUIREMENTS

Early and late run sockeye salmon minimum escapement goals and projected brood numbers required by PCH in 1997 are described in Table 5.

Afognak Lake is the early run sockeye salmon brood source for 1997 egg takes to provide fry for stocking at Hidden, L. Waterfall, Crescent, Sorg, and Jennifer Lakes in 1998. In 1998 early run juveniles will be stocked in Jennifer Lake rather than Little Kitoi Lake. A total of ~1,610 Afognak Lake sockeye salmon will be required in 1997 for PCH enhancement projects. The lower range of the Biological Escapement Goal (BEG) for Afognak Lake is 40,000 sockeye salmon (Malloy and Prokopowich 1992; Brennan et al. 1996). Approximately 50% of the escapement in excess of the minimum goal (40,000) will be available for brood stock collection. Eggs will not be collected if escapement is less than 40,000 salmon.

Malina and Laura Lakes are being rehabilitated in response to depressed runs. A total of 454 Malina Lake and 454 Laura Lake sockeye salmon will be required in 1997 for these rehabilitation projects. The minimum escapements necessary to sustain wild runs at these early run systems have been estimated to be 1,600 and 5,000 sockeye salmon, respectively. Approximately 50% of the escapement in excess of the minimum goals will be available for brood stock collection. Eggs will not be collected if escapement is less than 1,600 at Malina Lake and 5,000 at Laura Lake. In addition, it has been determined that if escapements reach 16,000 at Malina Lake and 25,000 at Laura Lake, egg takes will not be necessary for rehabilitation purposes (i.e. wild fry recruitment will be sufficient).

Saltery Lake sockeye is the late run brood source for fry stocking at Ruth Lake. In 1997, this stock is also proposed as a brood source for stocking at Spiridon Lake. Approximately 5,400 sockeye salmon will be necessary in 1997 for brood stock for these stocking projects. The lower range of the Biological Escapement Goal (BEG) for Saltery Lake is 20,000 sockeye salmon (Malloy and Prokopowich 1992; Brennan et al. 1996). Approximately 50% of the escapement in excess of the minimum goal (20,000) will be available for brood stock collection. Eggs will not be collected if escapement is less than 20,000 salmon.

Upper Station sockeye salmon were the primary late run brood source for PCH stocking projects prior to 1997. The Spiridon Lake enhancement project is the primary recipient of resultant fry. Jennifer Lake has also been stocked with late run Upper Station fry. In addition, this brood source was used for stocking juvenile in Little Kitoi Lake and Bay to provide returns to Kitoi Bay Hatchery. These returns to Little Kitoi Lake were intended to be used as a brood source for stocking Spiridon Lake; thus, eliminating the need to take eggs at Upper Station. Upper Station, then, would only be utilized for brood fish in the event of a marginal run at Little Kitoi during the development phase of brood stock development at Kitoi. Returns to Little Kitoi (or Upper Station) will only be used in 1997 if permits are not approved for a SALTERY Lake egg take. If this scenario occurs, approximately 5,200 Upper Station or 7,000 Little Kitoi (lower fecundity) sockeye salmon will be needed. The lower range of the Biological Escapement Goal (BEG) for late run Upper Station Lake is 150,000 sockeye salmon (Malloy and Prokopowich 1992; Brennan et al. 1996). Approximately 50% of the escapement in excess of this goal will be available for brood stock collection. Eggs will not be collected if escapement is less than 150,000 fish. Little Kitoi Lake is not anadromous and does not have a BEG; however, an escapement of 14,000 will be necessary to assure brood collection goals due to difficulty in locating spawners within the lake.

Buskin River coho salmon are used for Kodiak road system stocking and for school incubation projects. Approximately 100 adults will be needed for brood stock in 1997. The lower range of the escapement goal for the system is 5,300 coho salmon, which includes 2,000 salmon for sport fish harvest. Thus, 50% of the escapement over 5,300 is available for brood collection. Brood collection will not occur if the escapement falls below the minimum goal.

SPECIAL STUDIES/RESEARCH

Spiridon Lake sockeye salmon run reconstruction will be conducted using scale pattern analysis. Stock identification is required to quantify the Spiridon Lake sockeye component of the catch because multiple stocks migrate along Kodiak's westside. The number of Spiridon Lake sockeye salmon commercially harvested in the NW and SW Kodiak Districts from 1994-1996 were estimated using a unique freshwater scale pattern (Nelson and Barrett 1994; Nelson and Swanton 1996b). Preliminary data indicates that ~320,000 Spiridon Lake sockeye salmon were harvested in 1996. The contribution of Spiridon Lake sockeye salmon to the 1997 westside commercial fishery (NW and SW Kodiak Districts) will be estimated and reported on by October 31, 1997. Funding for this project will be provided by KRAA.

Smolt abundance will be estimated and samples collected for age and condition during migration out of Spiridon Lake and Malina Lakes as a check on stocking density and to assist with run forecasts. Smolt will also be sampled for condition and age at all other systems stocked with juvenile sockeye salmon. Lake sampling will be conducted to evaluate zooplankton abundance and water quality parameters. All lakes will be monitored by tow-netting and hydroacoustics to evaluate juvenile sockeye population trends.

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Table 1. Sockeye salmon egg takes (1996), planned releases (1997,1998), projected returns (2000,2001), and fish transport permits (FTP), Kodiak Management Area.

Lake	Eggtake		Releases			Adult Returns ^a			FTP	
	eggs	adults	Number	size (g)	Date	2000	2001	Total	Number	Expires
Early Run (ER) : Donar Stock Afognak Lake										
Hidden	600,000	400	250,000	0.50	June	7,000	3,000	10,000	91A0017	12/31/97
			150,000	12.5	October	13,125	5,625	18,750		
L.Waterfall	400,000	260	200,000	12.50	October	17,500	7,500	25,000	91A0021	12/31/97
Crescent	600,000	400	400,000	0.50	June	11,200	4,800	16,000	91A0022	12/31/97
L.Kitoi	200,000	150	100,000	12.50	October	7,000	3,000	10,000	96A0069	12/31/02
Sorg	300,000	200	150,000	4.0-12.5	August;October	13,125	5,625	18,750	94A0037 ^b	7/31/99
			100,000	>12.5	May ^c	11,550	3,450	15,000	New FTP Required	
Afognak	500,000	330	400,000	<4.0	July	8,400	3,600	12,000	88A1021	12/31/97
Total:	2,600,000	1,740	1,750,000			88,900	36,600	125,500		
Early Run: donar stock Malina Lake										
Malina ^d	800,000	454	300,000	2.00	July	4,500	4,500	9,000	96A0070	12/31/02
			200,000	12.50	October	10,000	10,000	20,000	New FTP Required	
Late Run (LR): donar stock Saltery Lake										
Ruth	220,000	122	150,000	0.25	June	4,200	1,800	6,000	95A0086	9/30/97

-Continued-

Table 1. (page 2 of 2)

Lake	Eggtake		Releases			Adult Returns ^a			FTP	
	eggs	adults	Number	size (g)	Date	2000	2001	Total	Number	Expires
Late Run: donar stock Upper Station Lake										
Spiridon	9,000,000	4,500	6,000,000	0.25	June	168,000	72,000	240,000	89A0001	9/15/97
Jennifer	800,000	310	500,000	0.25	June	14,000	6,000	20,000	91A0020	12/31/97
Total:	9,800,000	4,810	6,500,000			182,000	78,000	260,000		
Total ER:	3,400,000	2,194	2,250,000			103,400	51,100	154,500		
Total LR:	10,020,000	4,932	6,650,000			186,200	79,800	266,000		
Grand Total:	13,420,000	7,126	8,900,000			289,600	130,900	420,500		

^a Assuming 70% age 1.2 and 30% age 1.3 adults except for Malina, 50% 1.2 and 50% 1.3.

^b FTP needed for smolt stocking.

^c Age-1 smolt to be stocked in May 1998.

^d Stocking levels are contingent on continued lake enrichment in 1997.

Table 2. Coho salmon egg takes (1996), planned releases (1997), projected returns (1999, 2000), and fish transport permits (FTP), Kodiak Management Area.

Lake	Eggtake ^a		Releases			Adult Returns ^b		FTP	
	eggs	adults	Number	size	Date	1999	2000	Number	Expires
Mayflower			13,000					93A0106	12/31/03
Island			45,000					93A0107	12/31/03
Dark			15,000					93A0108	12/31/03
Mission			24,500					93A0109	12/31/03
Potato Patch			19,000					93A0110	12/31/03
Southern			7,000					93A112	12/31/03
Pony			4,200					93A111	12/31/03
Total Road System	180,000	100	127,700			1,700	250	93A0105	12/31/03
Scientific Ed.	3,000	2	600			8	1	P97026	12/31/97
								P97038	12/31/97
								P97039	12/31/97
								P97044	12/31/97
								P97049	12/31/97
								P97050	12/31/97
								P97051	12/31/97
								P97052	12/31/97

^a Donor stock: Buskin River

^b Assume 90% of adults return as age 1.1 fish; 10% as age 2.1 fish (Len Schwarz, personal communication).

Table 3. Proposed sockeye salmon egg takes (1997), planned releases (1998, 1999), projected returns (2001,2002), and fish transport permits (FTP), Kodiak Management Area.

Lake	Eggtake		Releases			Adult Returns ^a			FTP	
	eggs	adults	Number	size (g)	Date	2001	2002	Total	Number	Expires
Early Run (ER): donar stock Afognak Lake										
Hidden	600,000	400	250,000	0.50	June	7,000	3,000	10,000	91A0017	12/31/96
			150,000	12.5	October	13,125	5,625	18,750		
L. Waterfall	500,000	340	300,000	12.50	October	26,000	11,000	37,000	91A0021	12/31/96
Crescent	500,000	260	400,000	0.50	June	11,200	4,800	16,000	91A0022	12/31/96
Sorg	425,000	310	150,000	4.0-12.5	August; October	13,125	5,625	18,750	94A0037 ^c	7/31/99
			100,000	>12.5	May ^b	11,550	3,450	15,000		
Jennifer	630,000	300	500,000	0.20	June	14,000	6,000	20,000	New	I
Afognak ^d									88A1021	9/15/97
Total:	2,655,000	1,610	1,850,000			96,000	39,500	135,500		
Early Run: donar stock Malina Lake										
Malina	800,000	454	300,000	0.50	June	3,000	3,000	6,000	96A0070	12/31/02
			200,000	12.50	October	10,000	10,000	20,000		
Early Run: donar stock Laura Lake										
Laura	800,000	454	300,000	0.50	June	4,200	1,800	6,000	93A0113	12/31/98
			200,000	12.50	October	14,000	6,000	20,000		

-Continued-

Table 3. (page 2 of 2)

Lake	Eggtake		Releases			Adult Returns ^a			FTP	
	eggs	adults	Number	size (g)	Date	2001	2002	Total	Number	Expires
Late Run (LR): donar stock Saltery Lake										
Spiridon ^e	9,400,000	5,200	7,000,000	0.30	July	196,000	84,000	280,000	New	
Ruth	400,000	180	300,000	0.25	May	8,400	3,600	12,000	95A0086	9/30/96
Saltery ^f									New	
Total:	9,800,000	5,380	7,300,000			204,400	87,600	292,000		
Late Run: donar stock Upper Station Lake ^g										
Spiridon	9,400,000	5,200	(7000) 7,000,000	0.30	July	196,000	84,000	280,000	89A0001	9/15/97
Total ER:	4,255,000	2,518	2,850,000			127,200	60,300	187,500		
Total LR:	9,800,000	5,380	7,300,000			204,400	87,600	292,000		
Grand Total:	14,055,000	7,898	10,150,000 ^h			331,600	147,900	479,500		

Stocking levels for Malina, Laura, Little Waterfall Lakes are contingent upon continued lake enrichment in 1998.

^a Assuming 70% age 1.2 and 30% age 1.3 adults except for Malina, 50% 1.2 and 50% 1.3.

^b Age-1 smolt to be stocked in May 1999.

^c FTP needed for smolt stocking.

^d If egg-fry survivals are greater than expected, excess fry will be stocked into Afognak Lake (donar system).

^e Saltery Lake will be primary brood source beginning in 1997 if permitting requirements are approved.

^f If egg-fry survivals are greater than expected, excess fry will be stocked into Saltery Lake (donar system).

^g This brood source will only be used if permitting is not approved to allow the use of Saltery Lake sockeye; if escapement at L.Kitoi Lake is sufficient, eggs (#) will collected there and Upper Station sockeye will be utilized if a shortage of brood stock occurs.

^h Analysis of inseason zooplankton trends may reduce eggtake goals and stocking numbers.

Table 4. Proposed coho salmon egg takes (1997), planned releases (1998), projected returns (2000,2001), and fish transport permits (FTP), Kodiak Management Area.

Lake	Eggtake ^a		Releases			Adult Returns ^b		FTP	
	eggs	adults	Number	size	Date	2000	2001	Number	Expires
Mayflower			13,000					93A0106	12/31/03
Island			45,000					93A0107	12/31/03
Dark			15,000					93A0108	12/31/03
Mission			24,500					93A0109	12/31/03
Potato Patch			19,000					93A0110	12/31/03
Southern			7,000					93A112	12/31/03
Pony			4,200					93A111	12/31/03
Total Road System	180,000	100	127,700			1,700	250	NA	
Scientific Ed.	3,000	2	600			8	1	P97026 P97038 P97039	12/31/97 12/31/97 12/31/97

^a Donor stock: Buskin River

^b Assume 90% of adults return as age 1.1 fish; 10% as age 2.1 fish (Len Schwarz, personal communication).

Table 5. Early and late run sockeye salmon minimum (desired) escapement goals and projected brood numbers required, 1997.

Early Run ^a	Minimum Escapement ^b	Brood Stock Required	Late Run ^c	Minimum Escapement ^d	Brood Stock Required
Afognak Lake	40,000	1,610	Saltery Lake	20,000	5,380
Malina Lake	1,600	454	U. Station Lake	150,000	5,200
Laura Lake	5,000	454	L.Kitoi Lake	14,000	7,000

^a Afognak Lake is the brood source for enhancement projects (barried lakes) at Hidden, Waterfall, Cresent, Little Kitoi and Sorg Lakes. In 1997, stocking early run juvenile in Little Kitoi will be discontinued; Jennifer Lake will replace Little Kitoi as an early run stocking location in 1998. Malina and Laura lakes are depressed anadromous systems being rehabilitated;

^b Minimum escapement refers to the lowest level which eggtakes may occur without harming wild stocks; approximately 50% of escapement in excess of this goal will be available for an eggtake; eggs will not be collected if the goal is not met.

^c Saltery Lake is the brood source for enhancement projects (barried lakes) at Spiridon and Ruth Lakes; In 1994, Saltery Lake brood stock was used for Spiridon Lake stocking on a one year experimental basis; Beginning in 1997, Saltery Lake will be the primary brood source for the Spiridon Lake project. Rose Tead Lake sockeye will be used as a back up brood source if poor escapements prevent the use of Saltery Lake stocks. Upper Station Lake was the primary brood source for Spiridon Lake stocking for all years, except 1994; Upper Station Lake stock was used to develop brood at Kitoi Bay - returning to Little Kitoi Lake; Upper Station and Little Kitoi Lake runs will not be used for brood in 1997, unless permits are not approved for the use of Saltery Lake stock.

^d Minimum escapement refers to the lowest level which eggtakes may occur without harming wild stocks; approximately 50% of escapement in excess of this goal will be available for an eggtake; eggs will not be collected if the goal is not met.

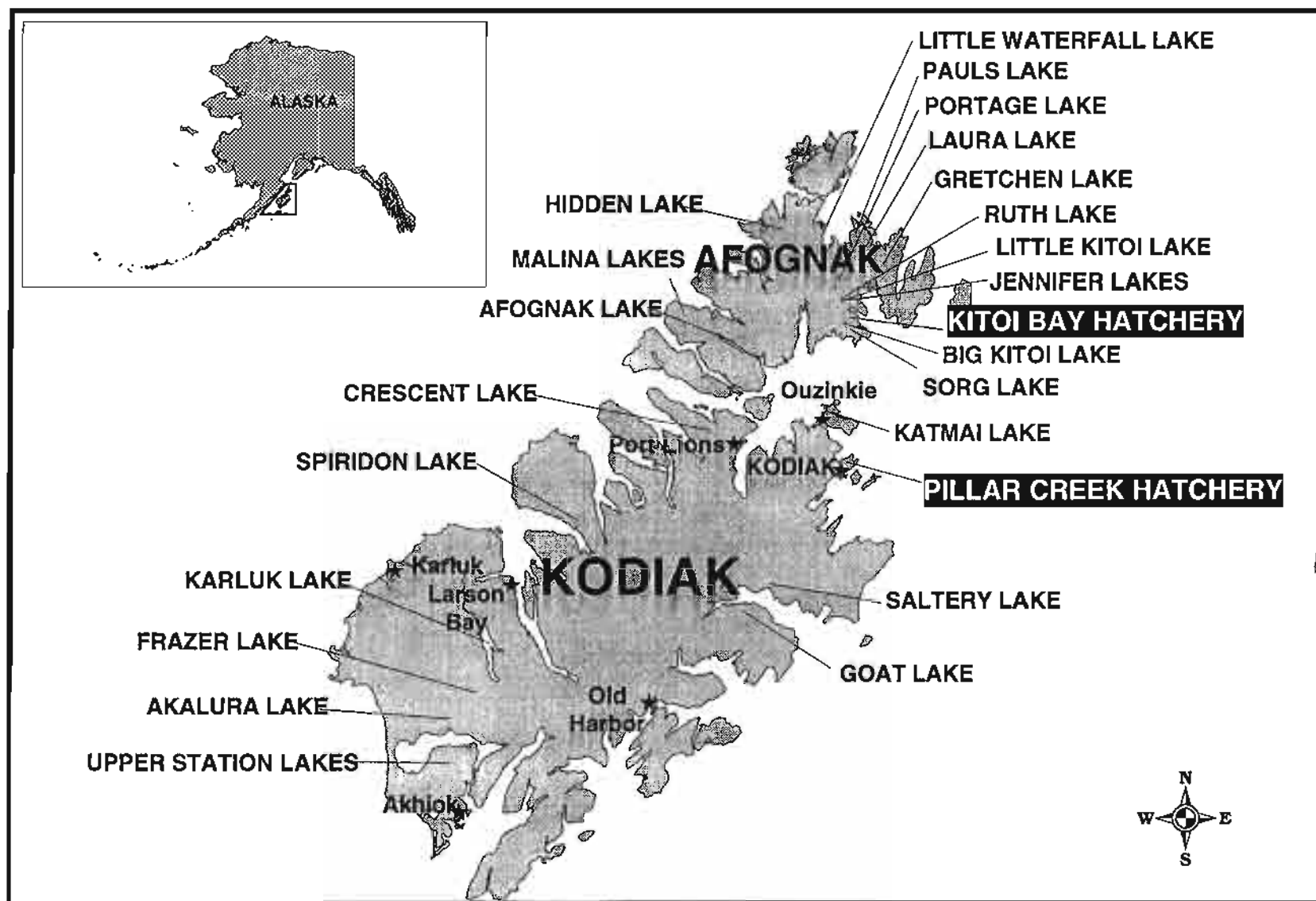


Figure 1. Locations of sockeye salmon enhancement and rehabilitation projects on Kodiak and Afognak Islands, 1951-1997.

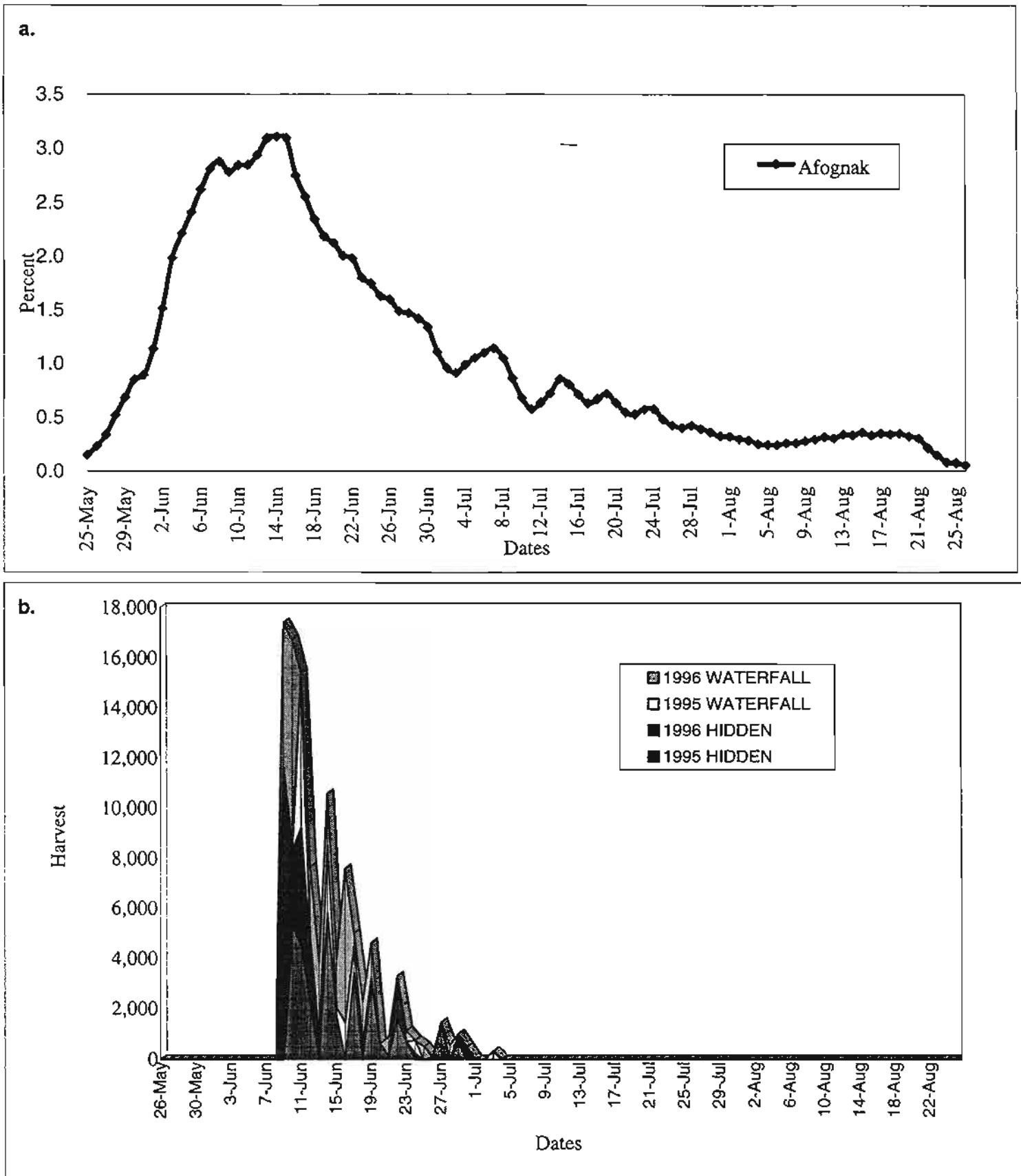


Figure 2. The post June Afognak Lake (AL) escapement has a large component of sockeye age 1.1, 1.2 and 2.1 that is not used for broodstock (Nelson and Swanton 1996). The compressed harvest (b) as compared to the broodstock run timing (a) can be attributed to the broodstock selection and the timing of fishing periods in the terminal harvest areas.

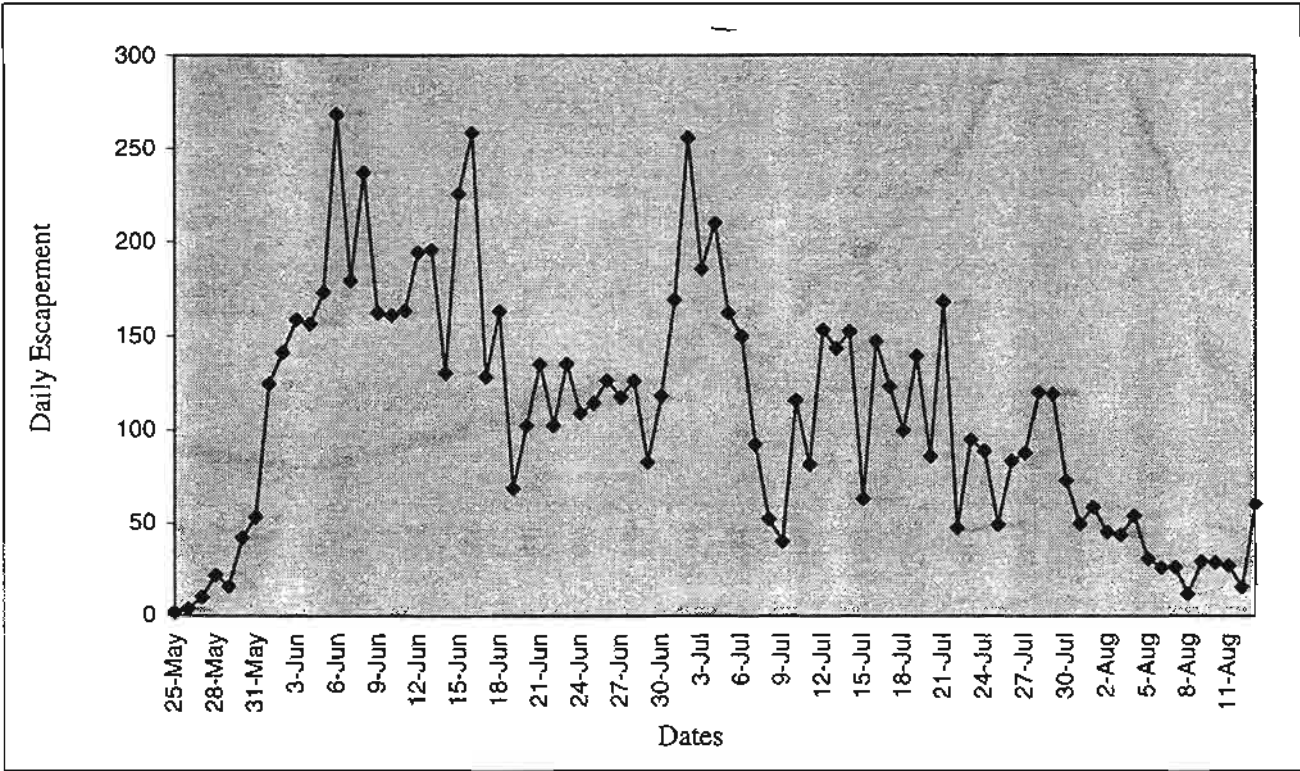


Figure 3. Malina Lake sockeye salmon escapement timing averaged by day, 1992 -1996.

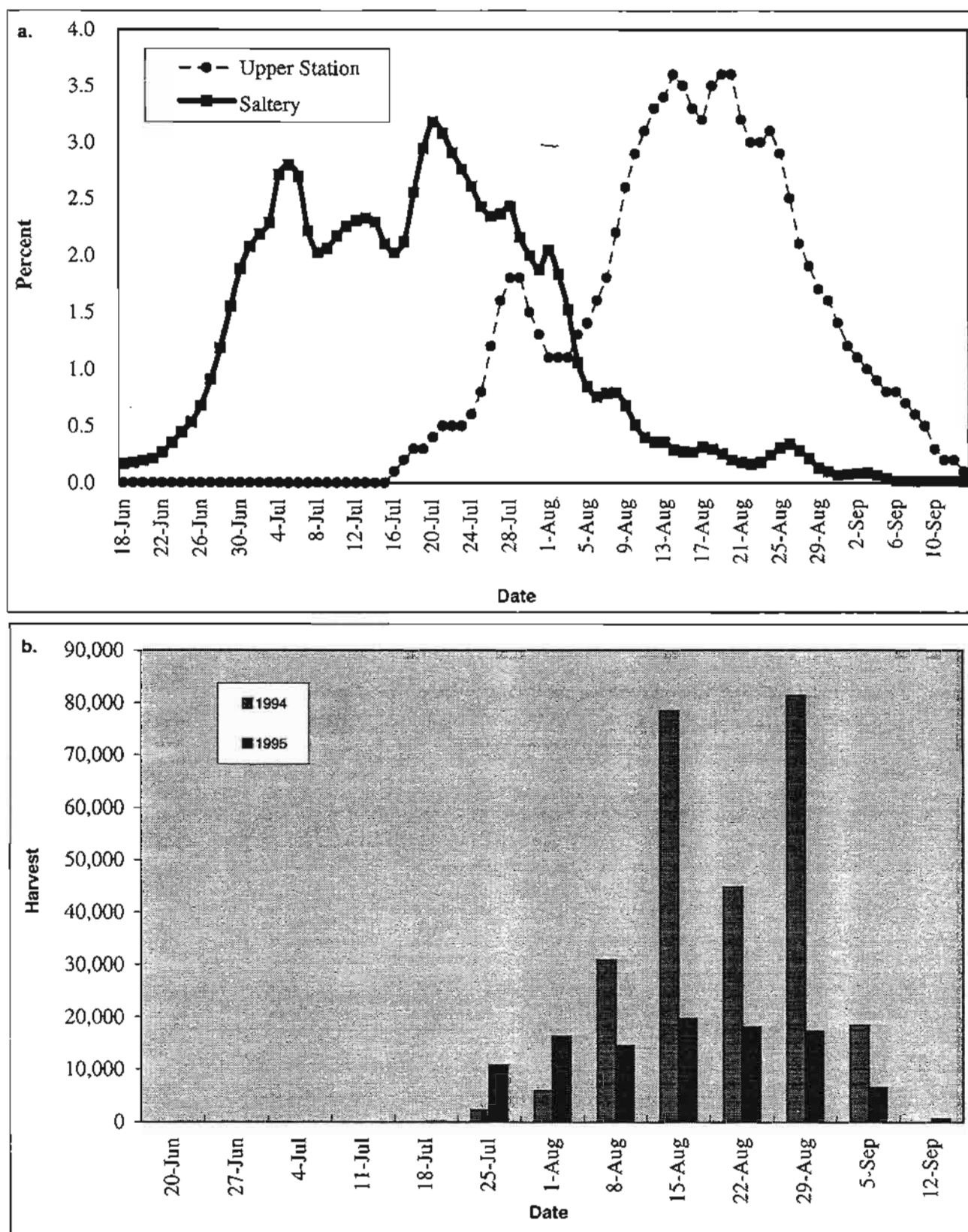


Figure 4. Sockeye salmon escapement timing into Upper Station and SALTERY lakes (a), and commercial harvest timing of Spiridon bound sockeye, 1994 - 1995 (b).

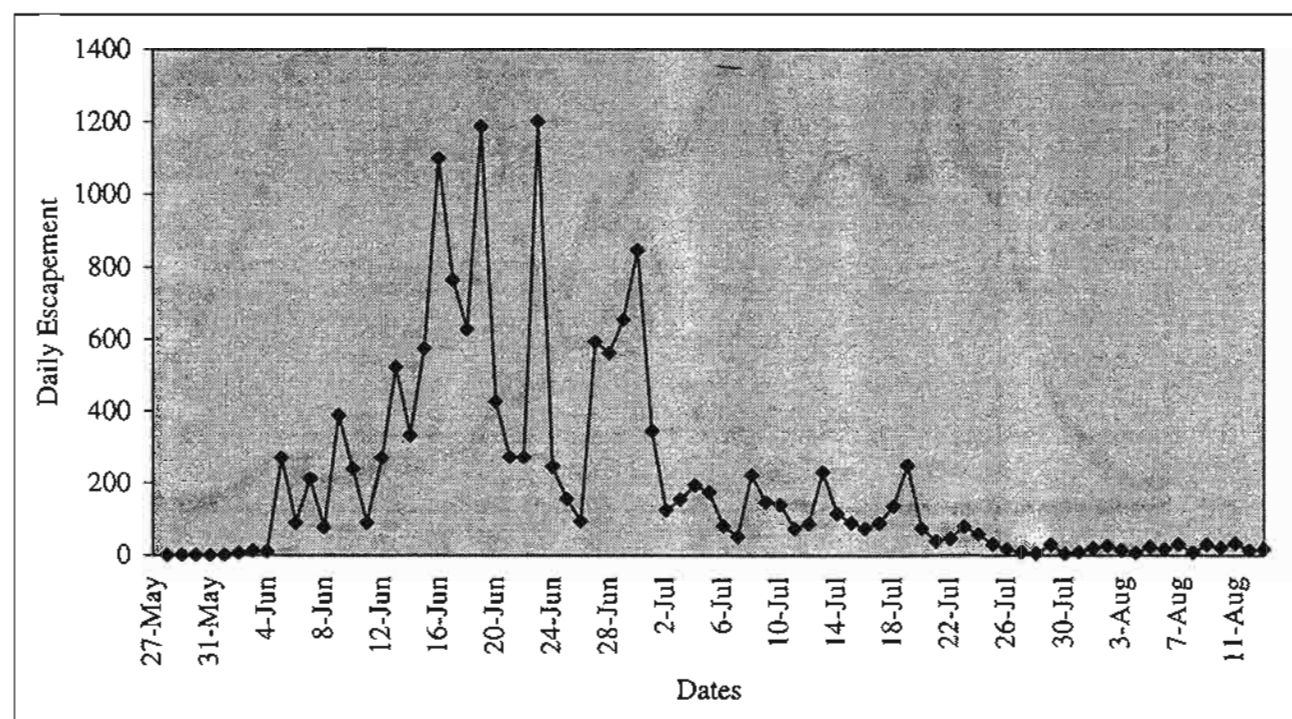


Figure 5. Laura Lake sockeye salmon escapement timing averaged by day, 1987 -1996.

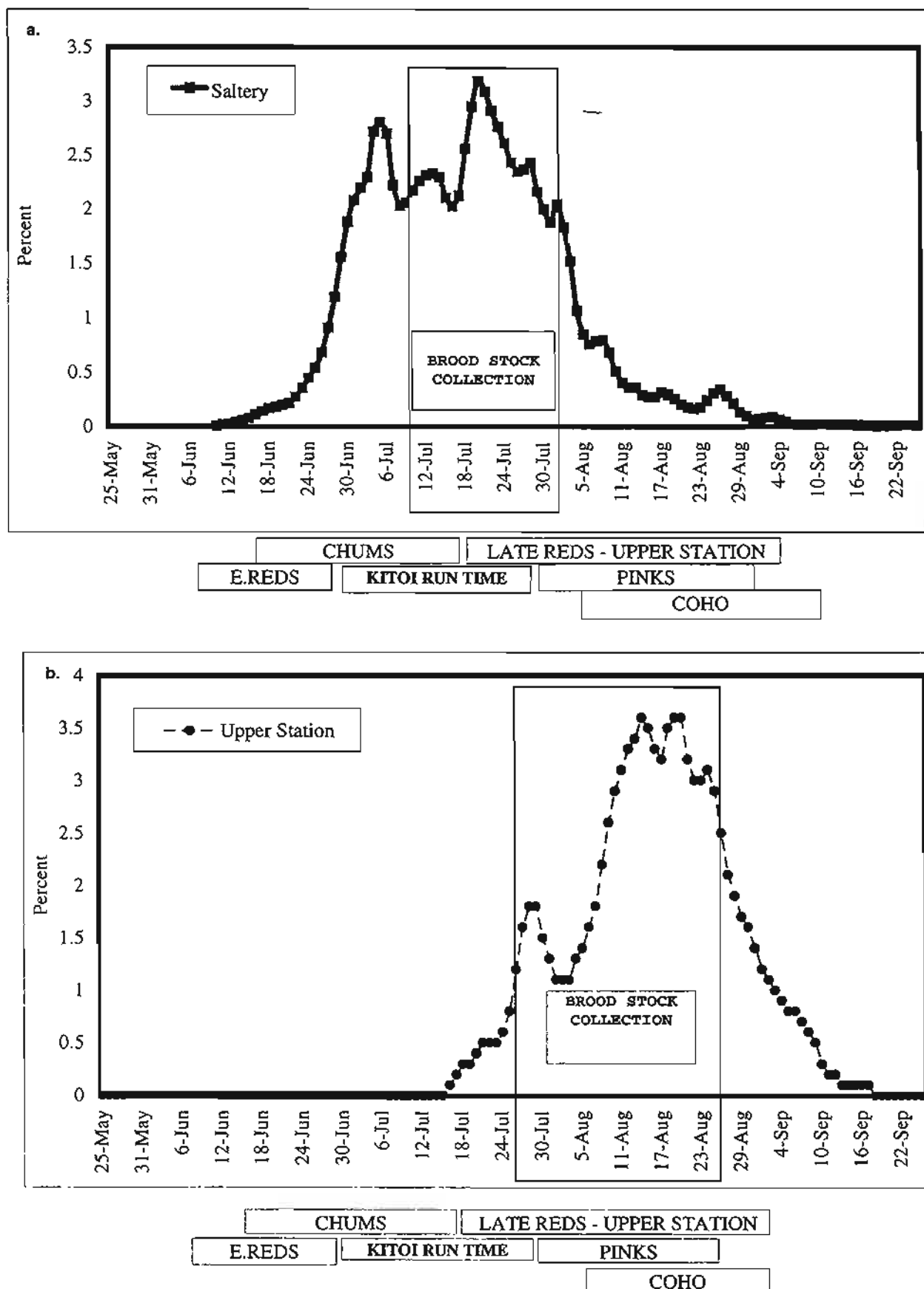


Figure 6. The run timing of salmon stocks in the Kitoi Bay Terminal Harvest Area compared to the late run Saltery sockeye salmon broodstock collection (a) and late run Upper Station sockeye salmon broodstock collection (b).

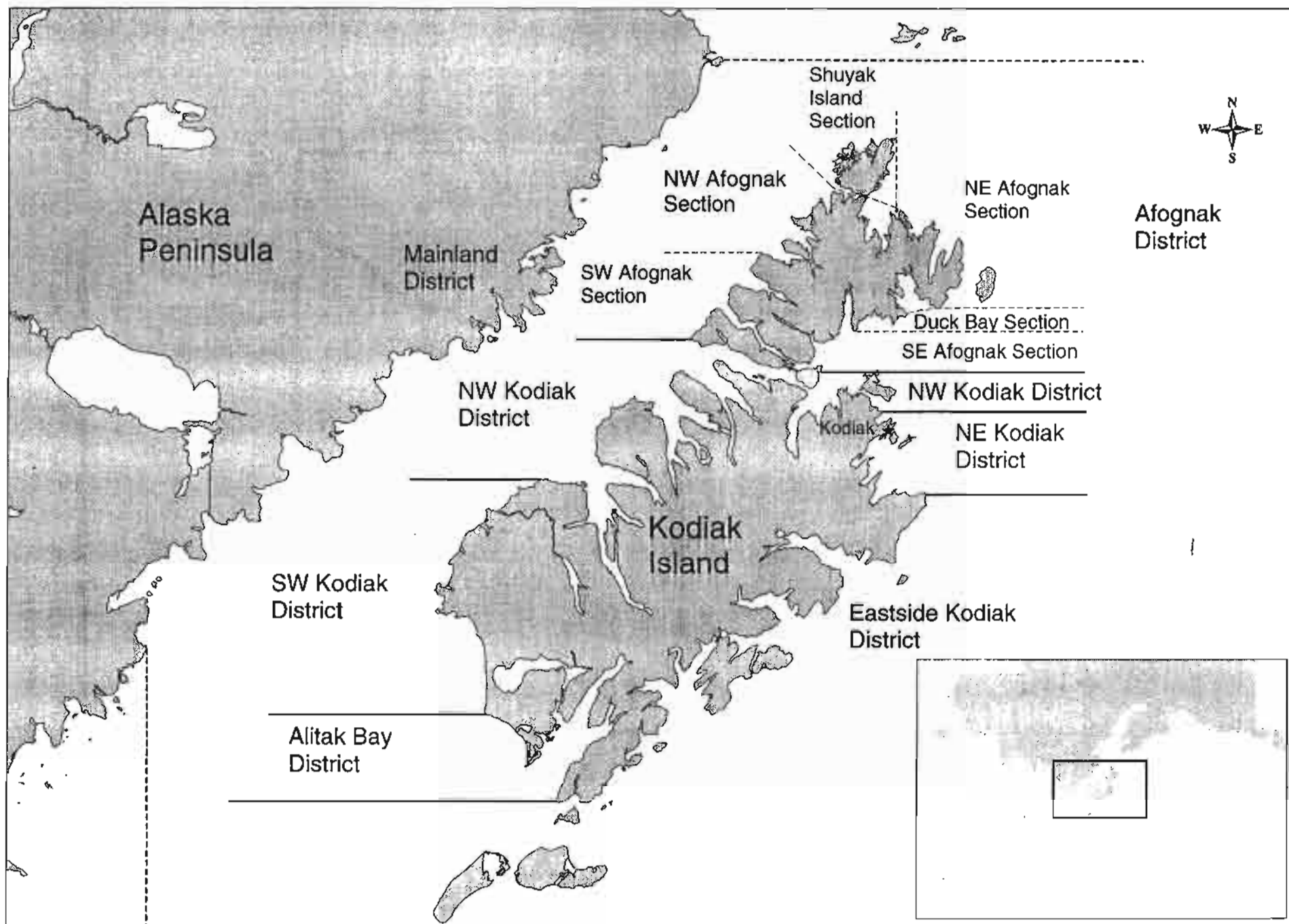


Figure 7. Map of the Kodiak Management Area depicting commercial fishing districts and selected sections.

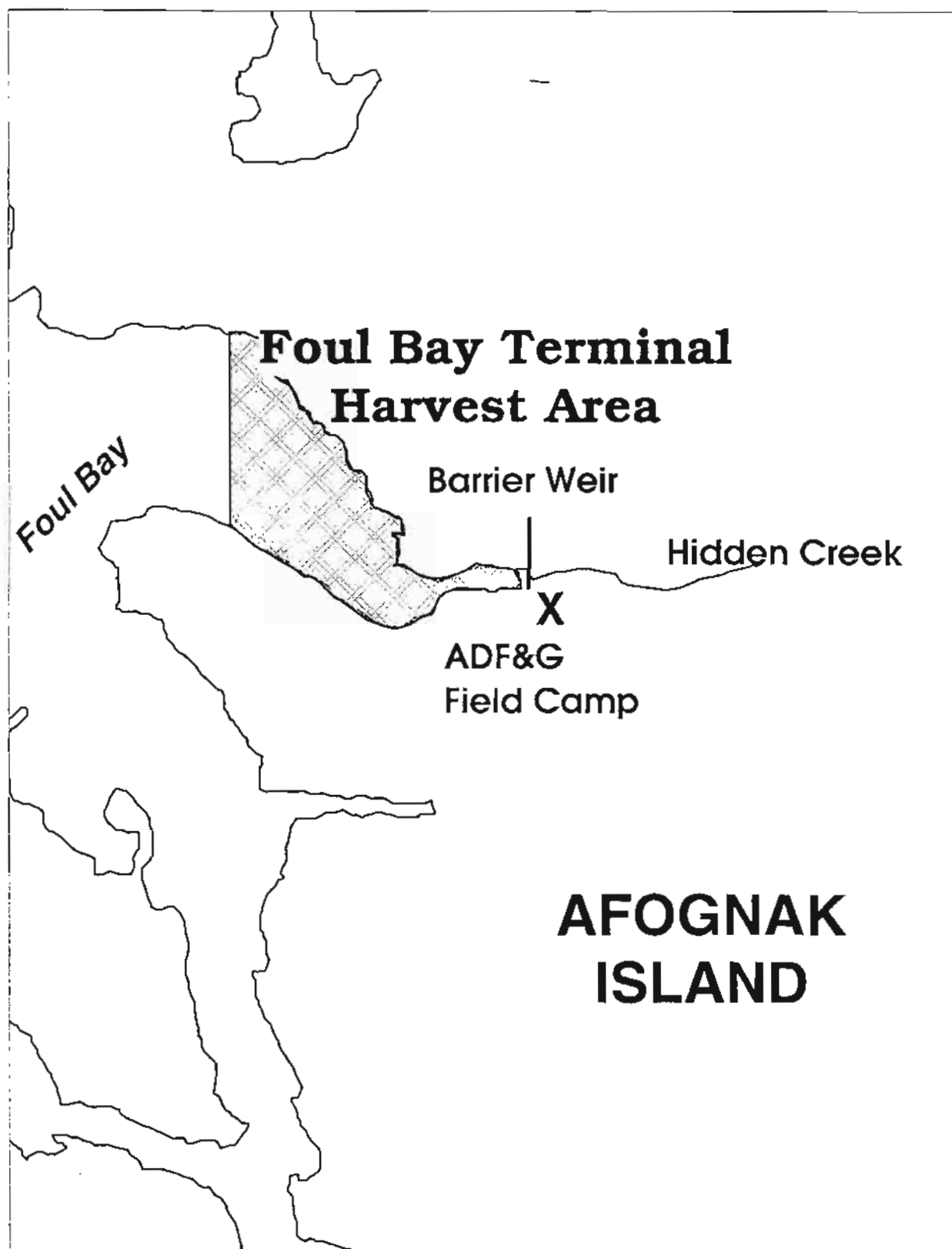


Figure 8. Foul Bay (Hidden Lake) Terminal Harvest Area.

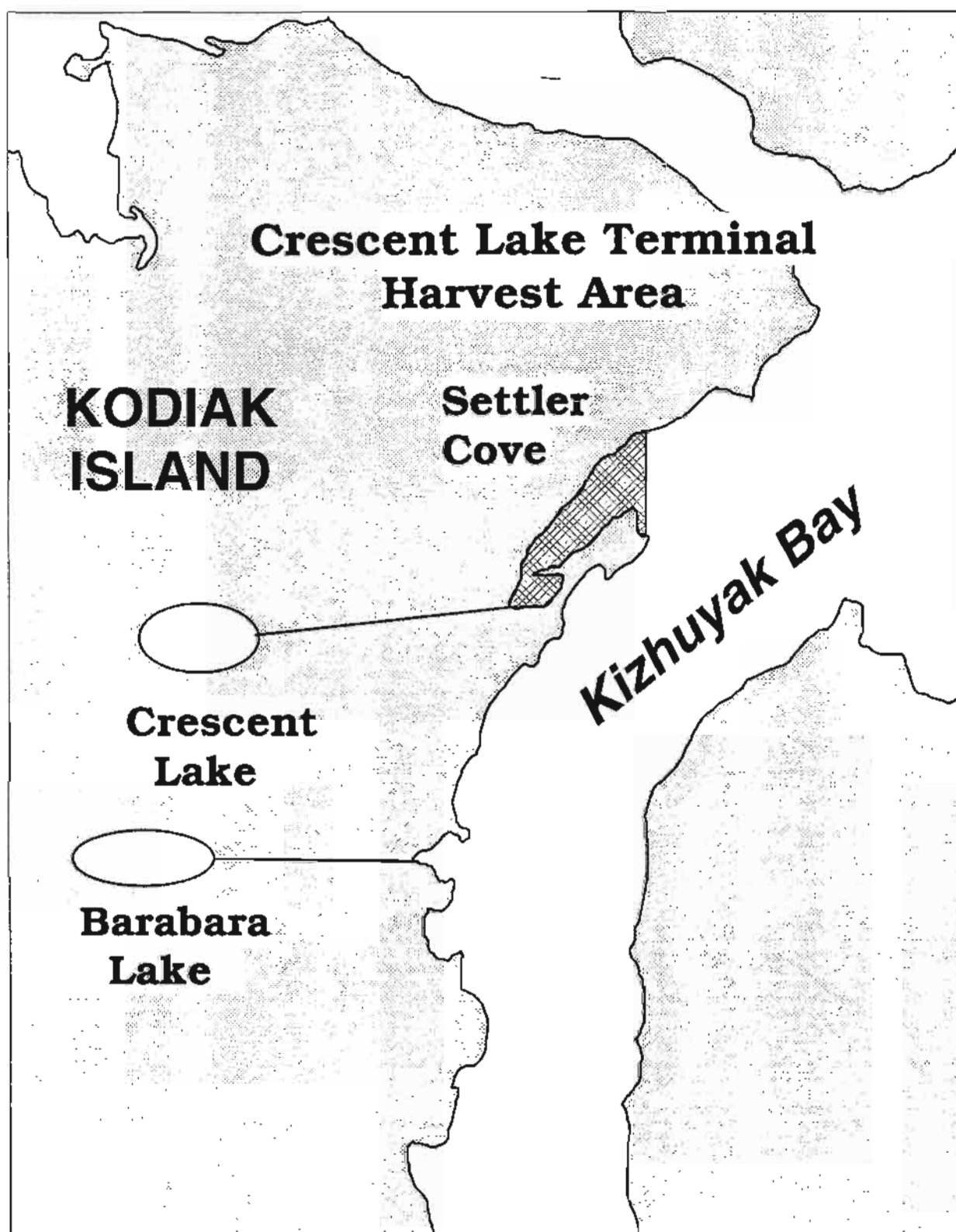


Figure 9. Crescent Lake Terminal Harvest Area.

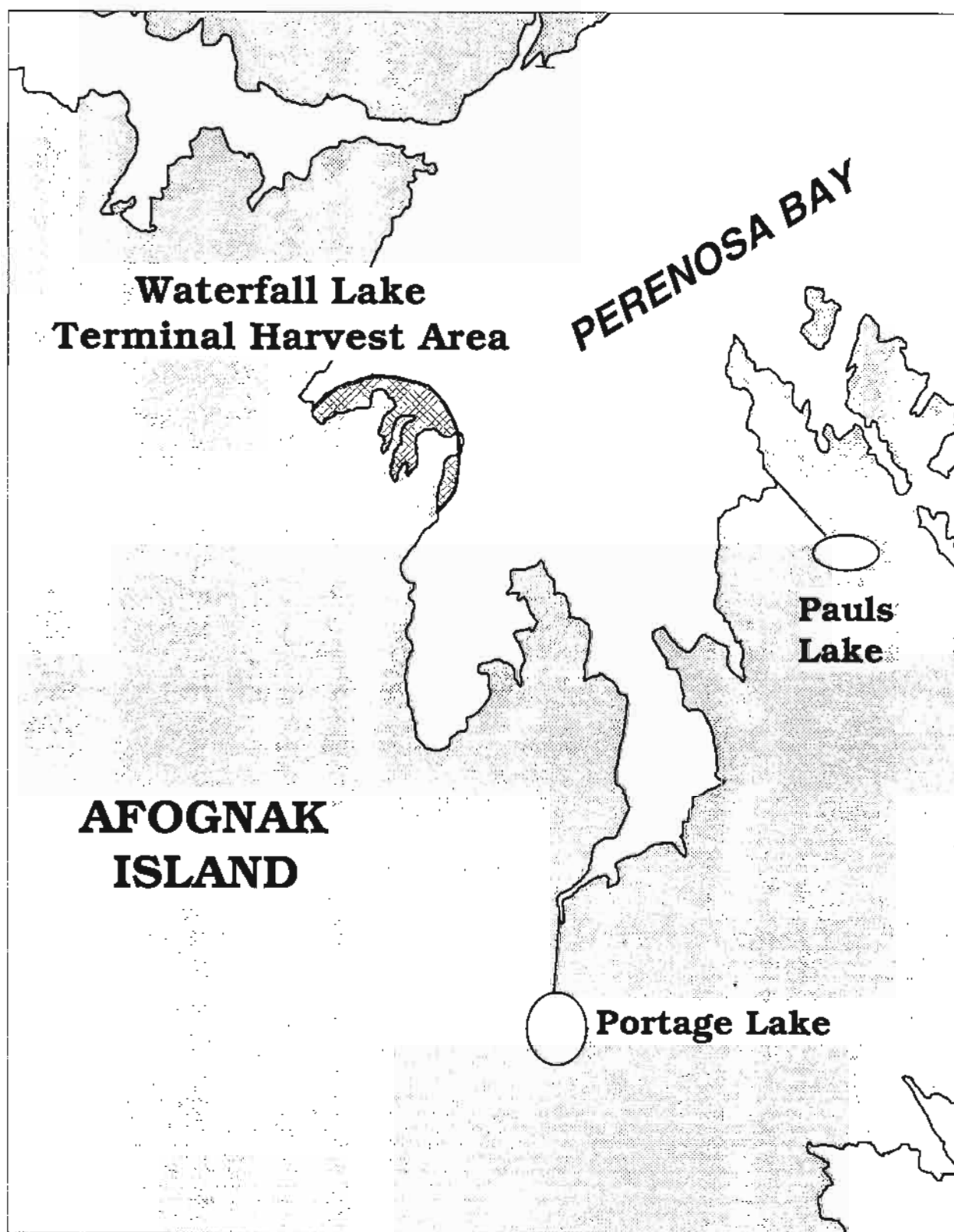


Figure 10. Waterfall Lake Terminal Harvest Area.

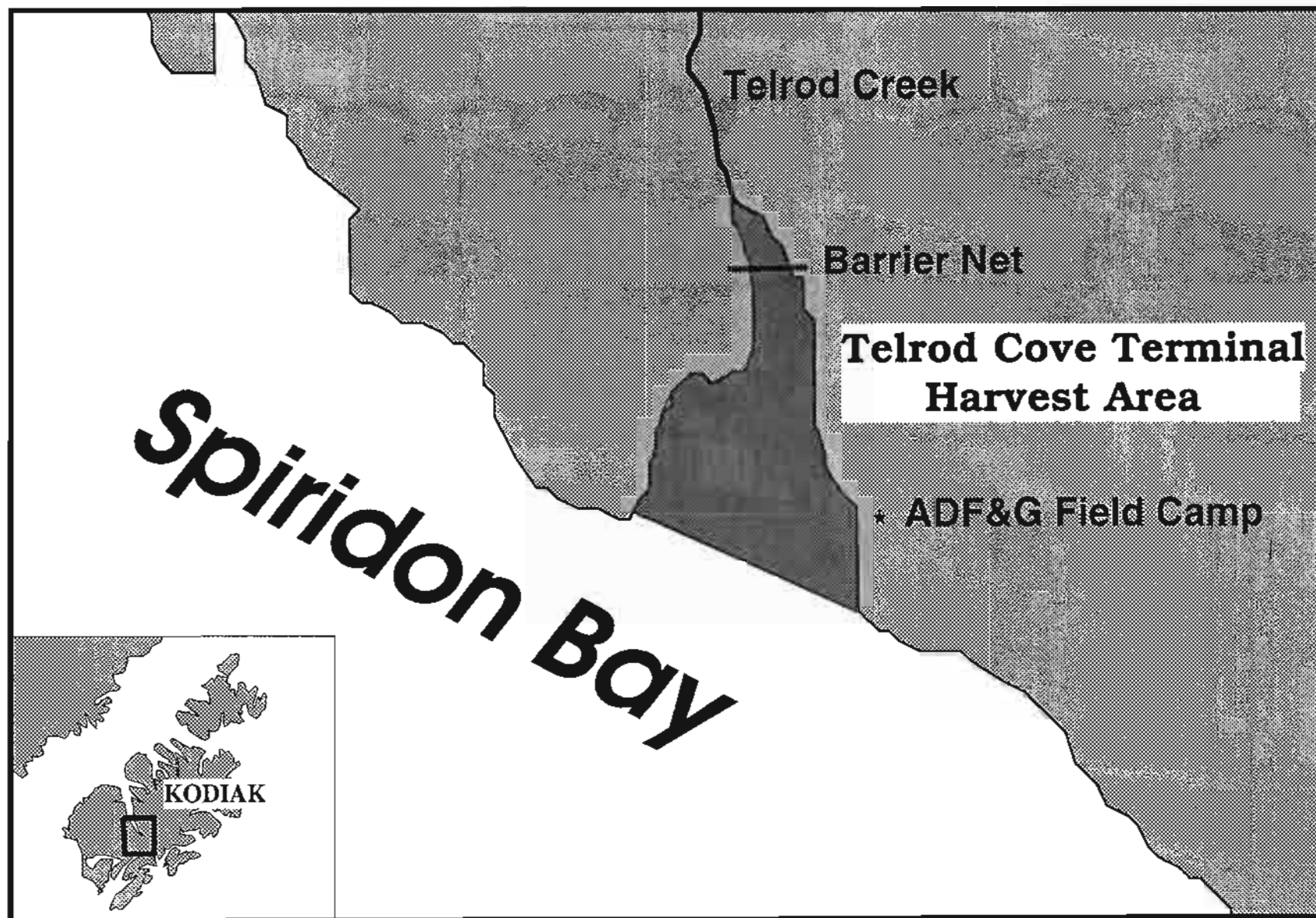


Figure 11. Telrod Cove Terminal Harvest Area, ADF&G camp and barrier net location, 1995 and 1996.

APPENDIX

Appendix A. Kodiak Area sockeye salmon stocking plan, 1997.

Lake	Brood Source	1997 Stocking Plan (millions)						1997 Actual Stocking		
		Limno Recom. end season 1995 (3/7/96)	Pillar Creek(PC); Kitoi Bay (KB) 1996 AMP (3/15/96)	Limno Recom. in season 1996(8/1/96)	Final Plan 1996 (8/10/96)	Limno Recom. end season 1996 (3/12/97)	Pillar Creek(PC); Kitoi Bay (KB) 1997 AMP (3/15/97)	Number	Dates	Size (g)
Sprinidon (PC)	U.Station	5.0-6.0 fry	6.0 fry (0.2-0.4g)	6.0 fry (0.2-0.4g)	6.0 fry (0.2-0.4g)	6.0 fry (0.2-0.4g)	6.0 fry (0.2-0.4g)			
Hidden (PC)	Afognak	0.25 fry none	0.25 fry (0.3g) 0.15 ps (12.5 g)	0.25 fry (0.3g) 0.15 ps (12.5 g)	0.25 fry (0.3g) 0.15 ps (12.5 g)	0.25 fry (0.3g) 0.15 ps (12.5 g)	0.25 fry (0.3g) 0.15 ps (12.5 g)			
L.Waterfall (PC)	Afognak	0.1-0.2 ps	0.3 ps (12.5 g)	0.2 ps (12.5 g)	0.2 ps (12.5 g)	0.2 ps (12.5 g)	0.2 ps (12.5 g)			
Crescent (PC)	Afognak	0.4 fry	0.4 fry (0.25 g)	0.4 fry (0.25 g)	0.4 fry (0.25 g)	0.4 fry (0.25 g)	0.4 fry (0.25 g)			
Jennifer (PC)	U.Station	0.25-0.35 fry	0.25 fry (0.2 g)	0.5 fry (0.2 g)	0.5 fry (0.2 g)	0.5 fry (0.2 g)	0.5 fry (0.2 g)			
L. Kitoi (PC)	Afognak	ps	0.150 ps (12.5 g)	0.10 ps (12.5 g)	0.10 ps (12.5 g)	0.10 ps (12.5 g)	0.10 ps (12.5 g)			
L. Kitoi (KB)	L. Kitoi	ps	0.150 ps (6.0 g)	0.10 ps (6.0 g)	0.10 ps (6.0 g)	0.10 ps (6.0 g)	0.10 ps (6.0 g)			
L.Kitoi estuary.(KB)	L.Kitoi	none	0.8 s (10.0 g)	0.8 s (10.0 g)	0.8 s (10.0 g)	0.8 s (10.0 g)	0.8 s (10.0 g)			
Ruth (PC)	Saltery	none	0.125 fry (0.3 g)	0.125 fry (0.3 g)	0.125 fry (0.3 g)	0.125 fry (0.3 g)	0.15 fry (0.25)			
Sorg (PC)	Afognak	none	0.150 ps (12.5 g)	0.150 ps (12.5 g)	0.150 ps (12.5 g)	0.150 ps (12.5 g)	0.150 ps (12.5 g)			
Afognak (PC) ^{a,b}	Afognak	stocking ok	0	0.5	0.5	0.5	0.4			
Malina (PC) ^a	Malina	none	0.6 fry (0.3 g) 0.25 fry (1.5 g) 0.25 ps (12.5 g)	0.3 fry (0.3 g) 0.0 0.2 ps	0.3 fry (0.3 g) 0.0 0.2 ps	0.3 fry (0.3 g) 0.0 0.2 ps	0.3 fry (0.3 g) 1.0 0.2 ps			
Laura (PC)	Laura	0.15-0.25 fry	0.58 fry (0.3 g) 0.12 ps (12.5 g)	0.0 0.2 ps	0 0	0.0 0.2 ps	0 0			

ps=presmolt; s=smolt

Early run brood stocks: Afognak, Malina, and Laura Lakes

Late run brood stocks: Upper Station, Little Kitoi, Saltery Lakes

^a 1997 stocking level is based on continued lake enrichment in 1997.

^b Will be used as contingency stocking location in the event of excess Afognak fry (higher survivals).

Appendix B. Kodiak Area sockeye salmon stocking plan, 1998

Lake	Brood Source	1998 Stocking Plan (millions)						1998 Actual Stocking		
		Limno Recom. end season 1996 (3/12/97)	Pillar Creek(PC); Kiloi Bay (KB) 1997 AMP (3/15/97)	Limno Recom. in season 1997(8/1/97)	Final Plan 1997 (8/10/97)	Limno Recom. end season 1997 (3/12/98)	Pillar Creek(PC); Kiloi Bay (KB) 1998 AMP (3/15/98)	Number	Dates	Size (g)
Hidden (PC)	Afognak	0.25 fry 0.15 ps	0.25 fry (0.3g) 0.15 ps (12.5 g)							
L. Waterfall (PC) ^a	Afognak	0.1 ps	0.3 ps (12.5 g)							
Crescent (PC)	Afognak	0.45-0.5 fry	0.4 fry (0.25 g)							
Jennifer (PC)	Afognak	0.5-0.75 fry	0.5 fry (0.2 g)							
Sorg (PC)	Afognak	0.125 ps	0.150 ps (12.5 g) 0.1 smolt (> 12.5 g)							
Afognak (PC) ^b	Afognak	0.5 fry	0							
Malina (PC) ^a	Malina	0.2-0.3 ps	0.3 fry (0.3 g) 0.2 ps (12.5 g)							
Laura (PC) ^a	Laura	0.1 ps	0.3 fry (0.3 g) 0.2 ps (12.5 g)							
Spiridon (PC)	Saltery	5.0-7.0 fry	7.0 fry (0.2-0.4g)							
Ruth (PC)	Saltery	0.2-0.3 fry	0.3 fry (0.3 g)							
L. Kiloi (KB)	Saltery	0.2 ps	0.3 ps (6.0 g)							
L. Kiloi estuary. (KB)	Saltery	NA	0.75 smolt (10.0 g)							
Saltery (PC) ^c	Saltery	^d	0							

Early run brood stocks: Afognak, Malina, and Laura Lakes

Late run brood stocks: Saltery Lake

ps=presmolt

^a 1996 limnology recommendation is based on cessation of lake enrichment; 1997 AMP stocking level is based on continued lake enrichment in 1998.

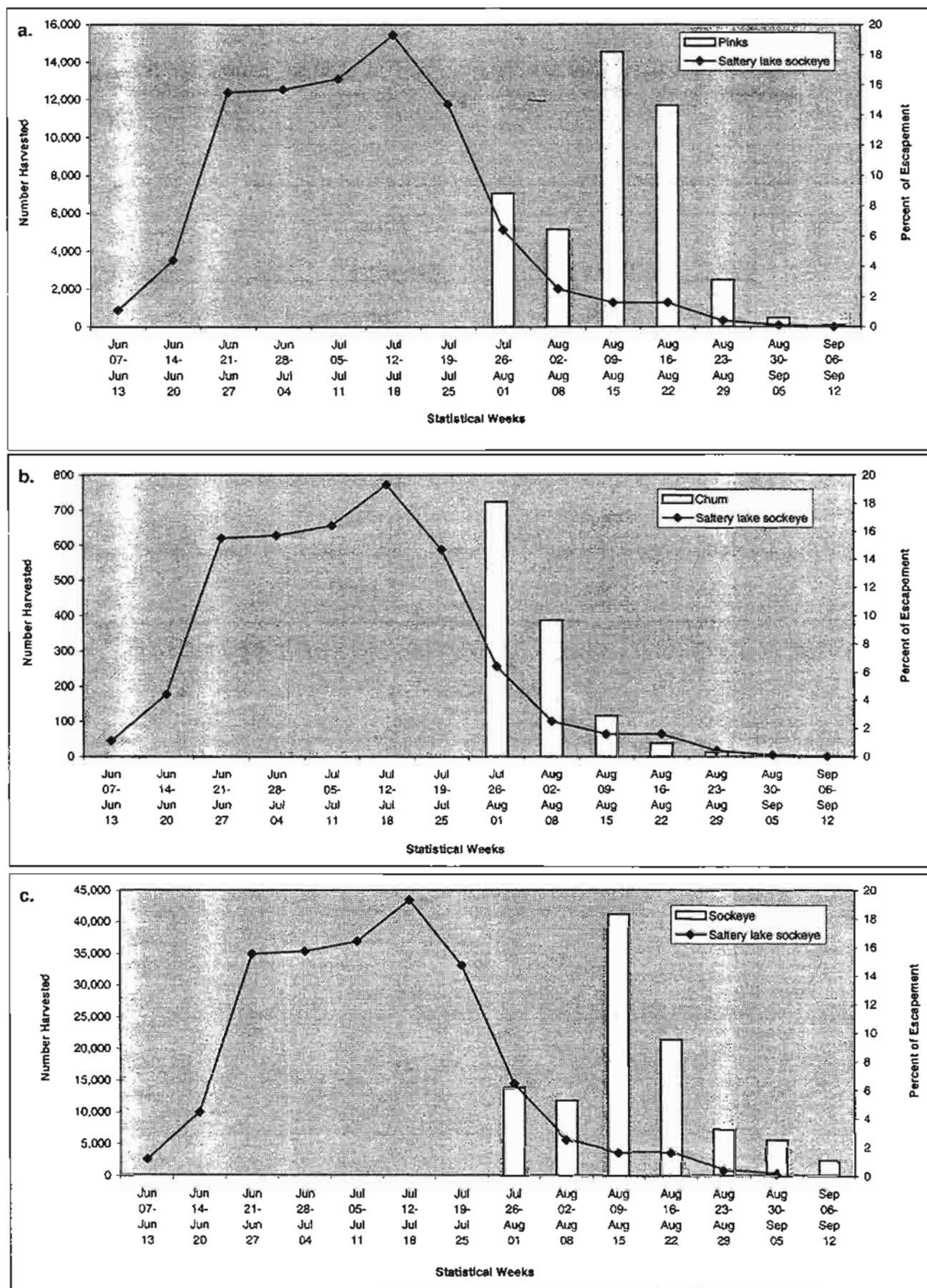
^b Will be used as contingency stocking location in the event of excess Afognak fry (higher survivals).

^c Will be used as contingency stocking location in the event of excess Saltery fry (higher survivals).

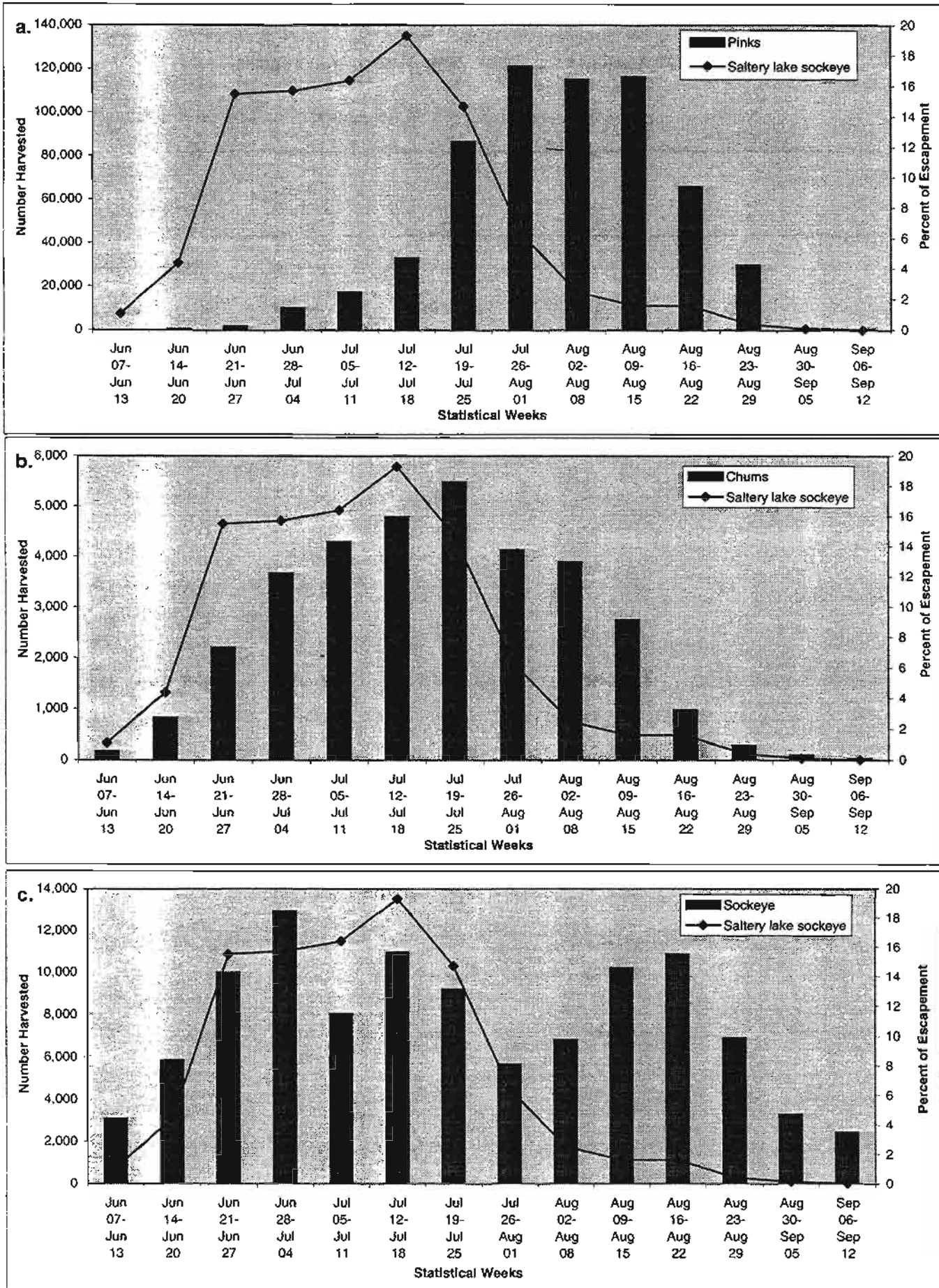
^d No specific recommendation; however, a conservative presmolt stocking plan may be acceptable.

Appendix C. Sockeye salmon survival assumptions used to estimate returns for Pillar Creek Hatchery.

Life History Stage Size (g)	System		
	Barren	Non-barren	Estuary
Fry 0.3 g	4.0%	2.0%	
Fingerling 1.5 g	6.0%	3.0%	
Pre-smolt 5.0 g	12.5%	10.0%	
Smolt 8.0 g	15.0%	15.0%	15.0%
Coho fry	NA	1.5%	



Appendix D. Estimated average (1984-1993) run timing of Sockeye salmon (ADF&G 1994) compared to the average harvest (1994-1996) for pink (a), chum (b), and sockeye salmon (c) caught in the Spiridon Bay Terminal Harvest Area (254-50).



Appendix E. Estimated average (1984-1993) run timing of SALTERY Lake sockeye salmon (ADF&G 1994) compared to the average (1986-1996) harvest for pink (a), chum (b), and sockeye (c) salmon caught in Spiridon Bay (254-40).

Appendix F. Upper Station sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1988	120	0.2	KBH	0.15 - 1989	Kitoi Bay
1989	3,000	5.0	PCH/KBH	0.26 - 1990 0.8 - 1990 0.3 - 1990	Spiridon Lake L. Kitoi Bay L. Kitoi Lake
1990	3,700	4.5	PCH	3.5 - 1991	Spiridon Lake
		1.5	KBH	1.25 - 1991	L. Kitoi Bay
1991	3,800	4.0	PCH	2.2 - 1992	Spiridon Lake
		2.3	KBH	1.8 - 1992	L. Kitoi Bay
1992	6,816	9.8	PCH	4.2 - 1993	Spiridon Lake
		1.9	KBH	0.05 - 1993 0.3 - 1994	L. Kitoi Lake L. Kitoi Bay
1993	5,551	7.8	PCH	5.0 - 1994 0.3 - 1994	Spiridon Lake Jennifer Lake
		2.0	KBH	1.6 - 1994	L. Kitoi Bay
1994	120	0.3	PCH	0.0 - 1995 0.2 - 1995	Spiridon Lake Jennifer Lake
	120	0.3	KBH	0.0 - 1995 0.2 - 1995 0.0 - 1996	L. Kitoi Bay Jennifer Lake L. Kitoi Bay
1995	3,668	7.3	PCH	4.5* - 1996 0.0 - 1996	Spiridon Lake Jennifer Lake
	0	0.5	KBH	0.0 - 1995 0.0 - 1996 0.5 - 1997	L. Kitoi Bay Jennifer Lake L. Kitoi Bay
1996	4,810	9.8	PCH	6.0* - 1997 0.5 - 1997	Spiridon Lake Jennifer Lake
	0	0.0	KBH	0.0 - 1996 0.0 - 1997	L. Kitoi Bay Jennifer Lake
1997 ^a	5,200	9.4	PCH	7.0* - 1998 0.0 - 1998	Spiridon Lake Jennifer Lake
	0	0	KBH	0.0 - 1998 0.0 - 1998	L. Kitoi Bay Jennifer Lake

^a Actual egg take to be determined no later than August 15, 1997 pending limnology results.

^b Upper Station egg take will be a contingent site if Saltery Lake is not approved as the primary egg take location or insufficient brood stock are available at, Little Kitoi Lake.

Appendix G. Afognak Lake sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1991	2,076	2.6	PCH	0.26 - 1992 0.40 - 1992 0.60 - 1992 0.46 - 1992 0.18 - 1992	Hidden Lake Crescent Lake Waterfall Lakes Afognak Lake L. Kitoi Bay
1992	1,890	2.7	PCH	1.1 - 1993 0.3 - 1993 0.2 - 1993	Hidden Lake Crescent Lake Waterfall Lakes
1993	2,169	3.4	PCH	0.25 - 1994 0.3 - 1994 0.15 - 1994 0.18 - 1994 0.10 - 1995	Hidden Lake Crescent Lake Waterfall Lakes L. Kitoi Lake L. Waterfall LK
1994	1,190	1.8	PCH	0.10 - 1995 0.10 - 1995 0.10 - 1995 0.10 - 1995 0.05 - 1995 0.10 - 1995	Hidden Lake Crescent Lake Waterfall Lakes Sorg Lake Ruth Lake ^a L. Kitoi Lake
1995	1,440	1.8	PCH	0.4 ^b - 1996 0.4 - 1996 0.1 - 1996 0.15 - 1996 0.10 - 1996 0.30 - 1996	Hidden Lake Crescent Lake Waterfall Lakes Sorg Lake L. Kitoi Lake Afognak Lake
1996	1,700	2.6	PCH	0.4 ^b - 1997 0.4 - 1997 0.2 - 1997 0.25 - 1997, 1998 0.10 - 1997 0.4 - 1997	Hidden Lake Crescent Lake Waterfall Lakes Sorg Lake L. Kitoi Lake Afognak Lake
1997	1,600	2.6 ^a	PCH	0.4 - 1998 0.4 - 1998 0.3 - 1998 0.25 - 1998, 1999 0.5 - 1998 0.0	Hidden Lake Crescent Lake Waterfall Lakes Sorg Lake Jennifer Lake Afognak Lake ^b

^a Actual egg take to be determined no later than August 15, 1996 pending limnology results.

^b Contingency stocking location in the event there are excess fry as result of higher than projected egg-to-fry survivals.

Appendix H. Malina Lake sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1991	120	0.15	PCH	0.09 - 1992	Malina Lake
1992	1,005	1.5	PCH	0.75 - 1993	Malina Lake
1993	644	0.9	PCH	0.5 - 1994	Malina Lake
1994	350	0.5	PCH	0.1 - 1995	Malina Lake
1995	400	0.59	PCH	0.4 - 1996	Malina Lake
1996	454	0.80	PCH	0.5 - 1997	Malina Lake
1997	454	0.8 ^a	PCH	0.5 - 1998	Malina Lake

^a Final egg take goal will be determined after inseason limnological evaluation.

Appendix I. Laura Lake sockeye salmon egg takes, past, present, and proposed.

Brood Year	Adults	Eggs (millions)	Facility	No. Stocked and Year (millions)	Stocking Location
1993	218	0.3	PCH	0.12 - 1994	Laura Lake
1994	53	0.06	PCH	0.04 - 1995	Laura Lake
1995	170	0.2	PCH	0.18 - 1996	Laura Lake
1996*	0	0	PCH	0.0 - 1997	Laura Lake
1997	454	0.8*	PCH	0.5 - 1998	Laura Lake

Final egg take number will be determined inseason after limnological evaluation.

*Escapement goal achieved.

SIGN-OFF

Chris Clevenger: Pillar Creek Hatchery Manager	Date
Steve Honnold: Area Development Biologist, CFM&D	Date
Jim McCullough: Regional Resource Development Biologist, CFM&D	Date
Dave Prokopowich: Area Management Biologist, CFM&D	Date
Wayne Donaldson: Regional Management Biologist, CFM&D	Date
Pete Probasco: Regional Supervisor, CFM&D	Date
Len Schwarz: Area Biologist, Sport Fish	Date
Doug McBride: Sport Fish Regional Supervisor	Date
Larry Malloy: Executive Director, KRAA	Date
The 1997 Hatchery Management Plan for PCH is hereby approved:	
Robert Bosworth: Deputy Commissioner, ADF&G	Date

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